PACIFIC MISSILE TEST CENTER
Point Mugu, California 93042-5000

Technical Publication 000052

TIDAL AND LUNAR DATA FOR POINT MUGU, SAN NICOLAS ISLAND, AND THE BARKING SANDS AREA DURING 1991

Compiled by
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Geophysics Division

31 December 1990

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PACIFIC MISSILE TEST CENTER

AN ACTIVITY OF THE NAVAL AIR SYSTEMS COMMAND

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OPSEC review by MR. M. FLORES.

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Printed and bound by Navy Publication and Printing Services Detachment, Point Mugu, CA

Technical Publication TP 000052

Published by.....Technical Reports Management Branch
Security Classification.....UNCLASSIFIED
First printing.....230 Copies

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	31 December 1990	Annual

4. TITLE AND SUBTITLE
TIDAL AND LUNAR DATA FOR POINT MUGU, SAN NICOLAS ISLAND, AND THE BARKING SANDS AREA DURING 1990

5. FUNDING NUMBERS

6. AUTHOR(S)
Charles J. Fisk

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Pacific Missile Test Center
Geophysics Division, Code 3250
Point Mugu, CA 93042-5000

8. PERFORMING ORGANIZATION REPORT NUMBER
TP 000052

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

Basic lunar and tidal data for Point Mugu, San Nicolas Island and the Barking Sands Area during 1990 are provided. The data presented are (1) Tidal data, (2) times of moonrise and moonset, (3) times of lunar phases, and (4) times of sunrise and sunset.

Keywords: Tides/tables/data; Ocean tides; Moon/phase: Moon/tables/data; California, Hawaii; (NM)

14. SUBJECT TERMS		15. NUMBER OF PAGES
Barking Sands, Hawaii	San Nicolas Island, CA	41
Point Mugu, CA	Tide Tables	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

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INTRODUCTION

This publication combines into a single source all tidal and lunar data for operational locations of the Pacific Missile Test Center for use in Calendar Year 1991.

The data presentations are in two main divisions: one for Point Mugu and San Nicolas Island, and the other for the Barking Sands area. Within each division, the times of moonrise and moonset and tidal data are given. Appendixes provide information on lunar phases, sunrise and sunset times and calculation of the tide at any time. This publication is issued annually. Information regarding this data may be obtained from the Geophysics Division of the Range Operations Department.

DATA SOURCE AND TIME REFERENCES

The data given here have been prepared from information contained in Tide Tables for the West Coast of North and South America including the Hawaiian Islands, 1991, published by the National Ocean Service.

For Point Mugu and San Nicolas Island, all times listed are Pacific Standard Time (PST); add eight hours to obtain Universal Coordinated Time (UCT or Z). When Daylight Savings Time (PDT) is in effect, 1 hour is to be added to the times given. In 1991, Pacific Daylight Time is scheduled to commence at 0200 PST on Sunday 7 April, and to end at 0200 PDT on Sunday 27 October.

For the Barking Sands Area, all times listed are Alaska-Hawaii Standard Time (AHST); add ten hours to obtain UCT. Daylight Savings Time is not observed in Hawaii.

TIDAL DATA

The ranges of tidal heights that may be expected at Point Mugu and San Nicolas Island are shown in table 1. The range of heights for the primary harbor in the Barking Sands area, Port Allen, is shown in table 2. The times and height of high and low tides for 1991 at Point Mugu are given in the even-numbered tables 4 through 26, and at San Nicolas Island in the odd-numbered tables 5 through 27. Similar tide data for Port Allen are given in tables 29 through 40.

Table 1. Tidal ranges for Point Mugu and San Nicolas Island

Tidal Levels	Point Mugu Height (Ft)	San Nicolas Is. Height (Ft)
Extreme high water	7.3	6.7
Mean higher high water	5.3	4.9
Mean high water	4.5	4.1
Mean tide level (mean sea level)	2.7	2.5
Mean low water	0.9	0.8
Mean lower low water	0.0	0.0
Extreme low water	-2.0	-1.8

Table 2. Tidal Ranges for Port Allen

Tidal Levels	Height (Ft)
Extreme high water	2.6
Mean higher high water	1.6
Mean high water	1.2
Mean tide level (mean sea level)	0.7
Mean low water	0.2
Mean lower low water	0.0
Extreme low water	-0.4

These tables list the times and heights of high and low tide for each month of the year and chronologically through each day. The heights are all measured from mean lower low water and are values for a sea unaffected by wind waves or swell. The height and character of the sea surface are influenced by factors other than the predictable positions of the moon and sun, and thus are likely to be higher or lower than computed values indicate.

LUNAR DATA

Times of moonrise and moonset for the Point Mugu-San Nicolas Island area in 1991 are given in table 3, and for the Barking Sands area in table 28, preceding the tidal data for the respective stations. Information regarding the phases of the moon in 1991 is found in appendix B.

	o '
Latitude	34 07 N
Longitude	119 07 W

Point Mugu NAS, California
Moonrise and Moonset for 1991

Pacific Standard Time

Nautical Almanac Office
U.S. Naval Observatory
Washington, D.C. 20392-5100

	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.	
Day	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	1822	0755	2032	0813	1916	0640	2107	0643	2145	0643	2228	0812	2159	0857	2157	1047	2257	1300		1342	0124	1410	0228	1345
2	1934	0838	2134	0842	2018	0709	2206	0720	2234	0732	2300	0909	2226	0955	2233	1151		1402	0009	1425	0228	1440	0330	1419
3	2043	0915	2236	0911	2120	0739	2302	0802	2317	0826	2328	1006	2253	1053	2316	1257	0000	1457	0118	1503	0332	1511	0431	1457
4	2148	0947	2336	0941	2221	0811	2353	0849	2355	0922	2356	1104	2323	1153		1405	0109	1546	0227	1537	0435	1544	0531	1538
5	2250	1016		1013	2321	0845		0940		1020		1202	2357	1256	0007	1511	0221	1628	0334	1609	0538	1620	0629	1625
6	2350	1044	0035	1049		0924	0040	1035	0028	1117	0024	1302		1402	0107	1613	0332	1705	0439	1640	0641	1659	0723	1716
7		1112	0133	1129	0018	1008	0121	1132	0059	1216	0053	1405	0036	1512	0215	1707	0442	1739	0544	1712	0741	1743	0811	1811
8	0049	1142	0229	1214	0112	1056	0158	1230	0128	1315	0125	1512	0123	1622	0328	1754	0551	1811	0649	1746	0838	1832	0854	1907
9	0147	1214	0321	1304	0202	1149	0230	1330	0156	1415	0202	1622	0220	1728	0442	1835	0657	1842	0752	1823	0930	1924	0931	2003
10	0245	1251	0409	1359	0246	1245	0301	1429	0225	1518	0246	1734	0327	1829	0555	1910	0802	1915	0855	1905	1016	2019	1004	2100
11	0342	1333	0452	1457	0326	1344	0329	1530	0256	1625	0339	1845	0439	1920	0705	1943	0906	1950	0954	1950	1057	2116	1034	2155
12	0437	1420	0529	1557	0401	1444	0358	1633	0331	1735	0442	1949	0555	2004	0812	2014	1009	2028	1049	2040	1133	2212	1102	2251
13	0528	1512	0603	1657	0433	1544	0428	1739	0412	1847	0552	2045	0708	2041	0917	2045	1110	2111	1138	2134	1204	2309	1129	2347
14	0613	1608	0633	1757	0502	1645	0501	1847	0501	1959	0706	2131	0819	2115	1021	2118	1206	2158	1222	2229	1234		1157	
15	0654	1707	0702	1858	0531	1747	0538	1958	0558	2106	0820	2211	0926	2145	1123	2153	1259	2249	1301	2326	1302	0005	1226	0045
16	0730	1806	0730	1959	0600	1851	0622	2109	0704	2205	0930	2245	1030	2216	1223	2233	1346	2343	1335		1329	0102	1258	0146
17	0802	1906	0758	2102	0630	1956	0713	2218	0815	2255	1036	2316	1132	2246	1322	2316	1427		1406	0023	1358	0201	1335	0250
18	0831	2006	0829	2207	0704	2104	0812	2320	0926	2337	1140	2345	1234	2319	1416		1504	0040	1435	0120	1429	0301	1420	0357
19	0859	2105	0903	2314	0742	2214	0918		1036		1241		1334	2355	1506	0004	1537	0137	1503	0218	1505	0405	1513	0506
20	0926	2206	0942		0827	2323	1027	0014	1142	0013	1342	0014	1433		1551	0057	1607	0235	1531	0317	1546	0513	1616	0614
21	0955	2309	1028	0023	0920		1137	0059	1246	0044	1442	0045	1529	0035	1630	0152	1636	0333	1601	0417	1635	0622	1726	0716
22	1026		1123	0131	1020	0028	1244	0138	1347	0114	1541	0118	1622	0120	1705	0249	1704	0431	1635	0520	1733	0731	1840	0811
23	1101	0014	1226	0234	1126	0126	1349	0211	1447	0142	1639	0155	1710	0210	1737	0347	1732	0530	1712	0626	1839	0835	1953	0857
24	1143	0123	1335	0331	1235	0217	1451	0242	1547	0212	1734	0237	1753	0303	1806	0445	1803	0632	1756	0734	1949	0932	2104	0937
25	1233	0233	1446	0420	1344	0300	1553	0311	1647	0243	1826	0323	1831	0359	1834	0543	1837	0735	1848	0842	2100	1021	2212	1012
26	1333	0341	1557	0502	1451	0337	1654	0339	1747	0317	1912	0414	1904	0457	1902	0641	1915	0840	1947	0947	2210	1103	2318	1045
27	1441	0445	1705	0538	1557	0409	1754	0409	1844	0355	1953	0509	1935	0554	1930	0740	2001	0947	2053	1047	2317	1139		1116
28	1554	0541	1811	0610	1700	0440	1855	0442	1939	0439	2030	0606	2003	0652	2001	0841	2053	1053	2201	1140		1212	0021	1148
29	1707	0628			1803	0509	1955	0517	2029	0527	2102	0703	2030	0749	2035	0944	2154	1156	2310	1225	0022	1243	0124	1221
30	1819	0708			1904	0538	2052	0558	2114	0619	2131	0800	2057	0847	2115	1049	2300	1252		1303	0125	1314	0225	1257
31	1927	0742			2006	0609			2153	0715			2126	0946	2202	1155			0018	1338			0325	1337

POINT MUGU TIDES
JANUARY 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0240	1.9	0901	7.1	1608	-1.8	2244	4.3
2	0331	1.8	0948	6.7	1649	-1.4	2329	4.4
3	0427	1.8	1037	6.1	1731	-.9	----	---
4	0014	4.5	0526	1.9	1126	5.3	1811	-.3
5	0102	4.6	0634	2.0	1221	4.4	1851	.4
6	0152	4.7	0757	1.9	1327	3.6	1935	1.1
7	0245	4.7	0933	1.7	1508	2.9	2020	1.7
8	0341	4.9	1106	1.2	1711	2.7	2119	2.2
9	0437	5.0	1211	.7	1849	2.9	2228	2.5
10	0526	5.2	1257	.2	1947	3.1	2327	2.5
11	0609	5.4	1336	-.1	2028	3.3	----	---
12	0017	2.5	0646	5.6	1409	-.4	2055	3.4
13	0059	2.5	0723	5.8	1439	-.6	2120	3.5
14	0133	2.4	0757	5.9	1506	-.7	2145	3.6
15	0208	2.2	0829	6.0	1532	-.7	2210	3.8
16	024[illegible]1		0858	5.9	1600	-.7	2235	3.9
17	0316	2.0	0930	5.7	1625	-.5	2304	4.0
18	0355	2.0	1005	5.4	1654	-.2	2329	4.1
19	0438	1.9	1038	4.9	1720	.1	0001	4.3*
20	0528	1.9	1120	4.3	1747	.6	----	---
21	0037	4.4	0634	1.9	1214	3.7	1818	1.1
22	0120	4.6	0800	1.7	1330	3.0	1854	1.6
23	0213	4.8	0943	1.2	1546	2.6	1949	2.1
24	0320	5.1	1109	.5	1759	2.7	2115	2.5
25	0430	5.5	1214	-.2	1907	3.1	2248	2.5
26	0535	6.0	1303	-.9	1950	3.5	2359	2.3
27	0631	6.4	1347	-1.4	2029	3.8	----	---
28	0059	2.0	0723	6.7	1429	-1.7	2104	4.2
29	0149	1.6	0809	6.8	1506	-1.7	2138	4.4
30	0238	1.3	0855	6.7	1543	-1.5	2212	4.7
31	0328	1.1	0939	6.3	1618	-1.1	2247	4.8

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
JANUARY 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0253	1.7	0858	6.3	1621	-1.6	2241	3.9
2	0344	1.6	0945	6.0	1702	-1.2	2326	4.0
3	0440	1.6	1034	5.5	1744	-.8	----	---
4	0011	4.0	0539	1.7	1123	4.8	1824	-.3
5	0059	4.1	0647	1.8	1218	4.0	1904	.4
6	0149	4.2	0810	1.7	1324	3.3	1948	1.0
7	0242	4.2	0946	1.5	1505	2.6	2033	1.5
8	0338	4.4	1119	1.1	1708	2.5	2132	1.9
9	0434	4.5	1224	.6	1846	2.6	2241	2.2
10	0523	4.7	1310	.2	1944	2.8	2340	2.3
11	0606	4.8	1349	-.1	2025	3.0	----	---
12	0030	2.3	0643	5.0	1422	-.4	2052	3.1
13	0112	2.2	0720	5.2	1452	-.5	2117	3.2
14	0146	2.1	0754	5.3	1519	-.6	2142	3.3
15	0221	1.9	0826	5.4	1545	-.6	2207	3.4
16	0253	1.8	0855	5.3	1613	-.6	2232	3.5
17	0329	1.8	0927	5.1	1638	-.4	2301	3.6
18	0408	1.8	1002	4.8	1707	-.2	2326	3.7
19	0451	1.7	1035	4.4	1733	.1	2358	3.9
20	0541	1.7	1117	3.9	1800	.5	----	---
21	0034	4.0	0647	1.7	1211	3.3	1831	1.0
22	0117	4.1	0813	1.5	1327	2.7	1907	1.4
23	0210	4.3	0956	1.1	1543	2.4	2002	1.8
24	0317	4.6	1122	.4	1756	2.5	2128	2.2
25	0427	4.9	1227	-.2	1904	2.8	2301	2.2
26	0532	5.4	1316	-.8	1947	3.2	0012	2.0*
27	0628	5.7	1400	-1.2	2026	3.4	----	---
28	0112	1.8	0720	6.0	1442	-1.5	2101	3.8
29	0202	1.4	0806	6.1	1519	-1.5	2135	4.0
30	0251	1.1	0852	6.0	1556	-1.3	2209	4.2
31	0341	1.0	0936	5.6	1631	-1.0	2244	4.3

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
FEBRUARY 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0414	1.1	1022	5.6	1649	-.5	2324	4.9
2	0506	1.1	1107	4.9	1721	.1	0000	4.9*
3	0602	1.2	1152	4.0	1753	.8	----	---
4	0040	4.8	0706	1.4	1252	3.2	1823	1.5
5	0125	4.7	0836	1.4	1427	2.6	1850	2.1
6	0225	4.5	1026	1.2	----	---	----	---
7	0338	4.5	1146	.8	1931	2.9	2142	2.8
8	0447	4.7	1242	.3	1956	3.1	2316	2.7
9	0546	4.9	1315	0.0	2011	3.3	----	---
10	0014	2.5	0631	5.2	1345	-.3	2032	3.5
11	0054	2.3	0710	5.5	1414	-.5	2050	3.7
12	0129	2.0	0742	5.7	1437	-.6	2109	3.9
13	0201	1.7	0814	5.7	1500	-.6	2128	4.1
14	0234	1.5	0845	5.7	1525	-.5	2151	4.4
15	0309	1.2	0919	5.5	1549	-.3	2214	4.6
16	0348	1.1	0956	5.1	1612	0.0	2240	4.7
17	0427	.9	1035	4.6	1639	.4	2308	4.9
18	0516	.9	1117	4.0	1704	.9	2342	5.0
19	0615	.9	1216	3.3	1732	1.5	----	---
20	0026	5.0	0734	.9	1344	2.7	1802	2.0
21	0124	5.0	0920	.7	1635	2.3	1900	2.5
22	0245	5.0	1055	.2	1823	2.9	2114	2.7
23	0414	5.2	1159	-.4	1902	3.3	2300	2.5
24	0527	5.6	1246	-.9	19..	3.8	----	---
25	0009	2.1	0626	5.9	1327	-1.1	2004	4.2
26	0103	1.5	0718	6.1	1406	-1.2	2035	4.5
27	0149	1.0	0803	6.1	1438	-1.1	2104	4.9
28	0234	.6	0849	5.9	1510	-.8	2132	5.1

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
FEBRUARY 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0427	1.0	1019	5.0	1702	-.4	2321	4.4
2	0519	1.0	1104	4.4	1734	.1	2357	4.4
3	0615	1.1	1149	3.6	1806	.7	----	---
4	0037	4.3	0719	1.2	1249	2.9	1836	1.3
5	0122	4.2	0849	1.2	1424	2.4	1903	1.8
6	0222	4.0	1039	1.1	----	---	----	---
7	0335	4.0	1159	.7	1928	2.6	2155	2.6
8	0444	4.2	1255	.3	1953	2.8	2329	2.5
9	0543	4.4	1328	0.0	2008	3.0	----	---
10	0027	2.3	0628	4.7	1358	-.3	2029	3.2
11	0107	2.0	0707	4.9	1427	-.4	2047	3.3
12	0142	1.8	0739	5.1	1450	-.5	2106	3.5
13	0214	1.5	0811	5.1	1513	-.5	2125	3.7
14	0247	1.3	0842	5.1	1538	-.4	2148	4.0
15	0322	1.1	0916	4.9	1602	-.3	2211	4.1
16	0401	1.0	0953	4.6	1625	0.0	2237	4.2
17	0440	.8	1032	4.1	1652	.4	2305	4.4
18	0529	.8	1114	3.6	1717	.8	2339	4.5
19	0628	.8	1213	3.0	1745	1.3	----	---
20	0023	4.5	0747	.8	1341	2.5	1815	1.8
21	0121	4.5	0933	.6	1632	2.3	1913	2.2
22	0242	4.5	1108	.2	1820	2.6	2127	2.5
23	0411	4.7	1212	-.4	1859	3.0	2313	2.2
24	0524	5.0	1259	-.8	1932	3.4	----	---
25	0022	1.8	0623	5.3	1340	-1.0	2001	3.8
26	0116	1.3	0715	5.5	1419	-1.1	2032	4.0
27	0202	.9	0800	5.5	1451	-1.0	2101	4.4
28	0247	.5	0846	5.3	1523	-.7	2129	4.6

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
MARCH 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0318	.4	0927	5.5	1542	-.4	2204	5.2
2	0400	.3	1010	4.9	1608	.2	2232	5.2
3	0443	.3	1050	4.3	1635	.8	2304	5.1
4	0531	.5	1135	3.6	1657	1.3	2336	4.9
5	0624	.8	1232	3.0	1719	1.9	----	---
6	0011	4.6	0737	1.0	1410	2.5	1727	2.3
7	0058	4.3	0924	1.1	----	---	----	---
8	0221	4.1	1100	.8	----	---	----	---
9	0402	4.2	1159	.5	1923	3.2	2308	2.7
10	0514	4.4	1236	.2	1934	3.4	0001	2.4*
11	0605	4.7	1305	-.1	1947	3.7	----	---
12	0040	2.0	0644	5.0	1332	-.2	2002	4.0
13	0115	1.6	0723	5.2	1357	-.3	2020	4.3
14	0147	1.1	0758	5.2	1419	-.2	2041	4.6
15	0222	.7	0833	5.2	1444	-.1	2103	4.9
16	0258	.3	0909	5.0	1509	.2	2128	5.2
17	0336	0.0	0948	4.6	1535	.5	2156	5.4
18	0420	-.1	1034	4.1	1603	1.0	2228	5.5
19	0507	-.1	1126	3.6	1630	1.5	2304	5.4
20	0608	0.0	1235	3.0	1703	1.9	2352	5.2
21	0725	.1	1426	2.7	1742	2.4	----	---
22	0056	5.0	0900	.1	1650	2.9	1925	2.7
23	0228	4.8	1027	-.1	1759	3.3	2146	2.6
24	0402	4.8	1130	-.4	1831	3.7	2317	2.2
25	0522	5.0	1217	-.6	1902	4.2	----	---
26	0014	1.6	0620	5.2	1259	-.6	1931	4.6
27	0105	.9	0713	5.3	1331	-.5	1959	5.0
28	0147	.4	0758	5.2	1403	-.2	2025	5.3
29	0228	0.0	0839	4.9	1432	.1	2053	5.5
30	0304	-.2	0920	4.6	1459	.5	2119	5.5
31	0345	-.3	1001	4.2	1524	1.0	2147	5.5

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
MARCH 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0331	.4	0924	4.9	1555	-.4	2201	4.7
2	0413	.3	1007	4.4	1621	.2	2229	4.7
3	0456	.3	1047	3.9	1648	.7	2301	4.6
4	0544	.4	1132	3.3	1710	1.1	2333	4.4
5	0637	.7	1229	2.7	1732	1.7	----	---
6	0008	4.1	0750	.9	1407	2.3	1740	2.0
7	0055	3.9	0937	1.0	----	---	----	---
8	0218	3.7	1113	.7	----	---	----	---
9	0359	3.8	1212	.4	1920	2.9	2321	2.5
10	0511	4.0	1249	.2	1931	3.1	0014	2.1*
11	0602	4.2	1318	-.1	1944	3.3	----	---
12	0053	1.8	0641	.5	1345	-.2	1959	3.6
13	0128	1.4	0720	4.7	1410	-.3	2017	3.9
14	0200	1.0	0755	4.7	1432	-.2	2038	4.1
15	0235	.6	0830	4.7	1457	-.1	2100	4.4
16	0311	.3	0906	4.5	1522	.2	2125	4.7
17	0349	0.0	0945	.1	1548	.4	2153	4.8
18	0433	-.1	1031	3.7	1616	.9	2225	4.9
19	0520	-.1	1123	3.3	1643	1.3	2301	4.8
20	0621	0.0	1232	2.7	1716	1.7	2349	4.7
21	0738	.1	1423	2.5	1755	2.1	----	---
22	0053	4.5	0913	.1	1647	2.6	1938	2.5
23	0225	4.3	1040	-.1	1756	3.0	2159	2.4
24	0359	4.3	1143	-.4	1828	3.3	2330	1.9
25	0519	4.5	1230	-.5	1859	3.8	----	---
26	0027	1.4	0617	4.7	1312	-.5	1928	4.1
27	0118	.8	0710	4.8	1344	-.4	1956	4.5
28	0200	.4	0755	4.7	1416	-.2	2022	4.8
29	0241	0.0	0836	4.4	1445	.1	2050	4.9
30	0317	-.2	0917	4.1	1512	.4	2116	4.9
31	0358	-.3	0958	3.8	1537	.9	2144	4.9

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
APRIL 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0422	-.2	1043	3.7	1550	1.4	2212	5.3
2	0504	0.0	1129	3.3	1611	1.8	2241	5.0
3	0553	.3	1229	2.8	1633	2.2	2317	4.7
4	0652	.6	1413	2.6	1641	2.5	2358	4.4
5	0818	.7	----	---	----	---	----	---
6	0108	4.0	0947	.7	1833	3.1	2042	3.0
7	0251	3.9	1050	.6	1823	3.3	2244	2.7
8	0421	3.9	1136	.4	1836	3.6	2340	2.3
9	0524	4.1	1208	.3	1851	4.0	----	---
10	0020	1.7	0615	4.3	1236	.3	1909	4.3
11	0052	1.1	0657	4.5	1305	.3	1927	4.8
12	0130	.5	0739	4.5	1330	.4	1952	5.2
13	0206	-.1	0820	4.5	1359	.6	2018	5.5
14	0245	-.5	0904	4.3	1427	.9	2046	5.8
15	0328	-.9	0952	4.1	1459	1.2	2122	6.0
16	0413	-1.0	1041	3.7	1534	1.6	2159	6.0
17	0507	-.9	1142	3.4	1609	1.9	2243	5.8
18	0606	-.7	1302	3.1	1658	2.3	2336	5.4
19	0717	-.5	1438	3.1	1811	2.6	----	---
20	0045	5.0	0835	-.3	1611	3.4	2008	2.7
21	0217	4.6	0946	-.3	1703	3.8	2159	2.4
22	0350	4.4	1046	-.2	1745	4.2	2318	1.7
23	0509	4.4	1137	-.1	1820	4.7	----	---
24	0014	1.1	0612	4.4	1217	.2	1852	5.1
25	0100	.4	0705	4.3	1251	.4	1918	5.4
26	0142	-.1	0753	4.2	1323	.8	1946	5.6
27	0220	-.4	0836	4.0	1352	1.1	2014	5.7
28	0256	-.6	0919	3.8	1420	1.4	2041	5.7
29	0334	-.6	1000	3.6	1445	1.7	2106	5.6
30	0410	-.6	1043	3.4	1512	2.0	2137	5.4

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
APRIL 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0435	-.2	1040	3.3	1603	1.2	2209	4.8
2	0517	0.0	1126	3.0	1624	1.6	2228	4.5
3	0606	.3	1226	2.6	1646	1.9	2314	4.2
4	0705	.5	1410	2.4	1654	2.3	2355	4.0
5	0831	.6	----	---	----	---	----	---
6	0105	3.6	1000	.6	1830	2.8	2055	2.7
7	0248	3.5	1103	.5	1820	3.0	2257	2.5
8	0418	3.5	1149	.4	1833	3.3	2353	2.0
9	0521	3.7	1221	.3	1848	3.6	----	---
10	0033	1.5	0612	3.9	1249	.3	1905	3.9
11	0105	1.0	0654	4.0	1318	.3	1924	4.3
12	0143	.4	0736	4.0	1343	.4	1949	4.7
13	0219	-.1	0817	4.0	1411	.5	2015	4.9
14	0258	-.4	0901	3.9	1440	.8	2043	5.2
15	0341	-.8	0949	3.7	1512	1.1	2119	5.4
16	0426	-.9	1038	3.3	1547	1.4	2156	5.4
17	0520	-.8	1139	3.1	1622	1.7	2240	5.2
18	0619	-.6	1259	2.8	1711	2.0	2333	4.8
19	0730	-.4	1435	2.8	1824	2.4	----	---
20	0042	4.5	0848	-.3	1608	3.1	2021	2.5
21	0214	4.1	0959	-.3	1700	3.4	2212	2.1
22	0347	4.0	1059	-.2	1742	3.8	2331	1.5
23	0506	4.0	1150	-.1	1817	4.2	----	---
24	0027	1.0	0609	4.0	1230	.2	1849	4.6
25	0113	.4	0702	3.9	1304	.4	1915	4.8
26	0155	-.1	0750	3.8	1336	.7	1943	5.0
27	0233	-.4	0833	3.6	1405	1.0	2011	5.1
28	0309	-.5	0916	3.4	1433	1.2	2038	5.1
29	0347	-.5	0957	3.3	1458	1.5	2103	5.0
30	0423	-.5	1040	3.1	1525	1.8	2134	4.8

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
MAY 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0448	-.4	1132	3.1	1537	2.3	2206	5.2
2	0534	-.1	1231	2.9	1604	2.5	2241	4.9
3	0624	.1	1354	2.8	1633	2.7	2323	4.5
4	0720	.4	1533	3.0	1738	2.9	----	---
5	0019	4.2	0827	.5	1632	3.2	1957	3.0
6	0138	3.8	0924	.6	1701	3.5	2154	2.6
7	0311	3.6	1013	.7	1725	3.9	2303	2.2
8	0431	3.6	1055	.8	1748	4.3	2349	1.5
9	0537	3.6	1131	.9	1810	4.8	----	---
10	0031	.8	0634	3.7	1205	1.0	1835	5.2
11	0112	0.0	0725	3.8	1241	1.2	1907	5.7
12	0151	-.6	0814	3.9	1313	1.3	1939	6.1
13	0236	-1.1	0906	3.9	1351	1.5	2018	6.4
14	0319	-1.5	0956	3.8	1433	1.7	2058	6.5
15	0408	-1.6	1052	3.6	1515	2.0	2143	6.4
16	0502	-1.5	1152	3.5	1607	2.2	2234	6.1
17	0558	-1.2	1259	3.5	1710	2.4	2331	5.6
18	0658	-.9	1408	3.7	1831	2.5	----	---
19	0037	5.0	0759	-.5	1515	3.9	2012	2.5
20	0158	4.4	0859	-.1	1610	4.3	2150	2.0
21	0328	4.0	0957	.3	1656	4.7	2306	.4
22	0450	3.7	1045	.7	1737	5.1	----	---
23	0006	.7	0604	3.6	1130	1.0	1812	5.4
24	0054	.2	0707	3.5	1209	1.4	1844	5.6
25	0136	-.2	0757	3.5	1244	1.7	1912	5.8
26	0215	-.5	0845	3.5	1316	1.9	1944	5.8
27	0250	-.7	0926	3.4	1344	2.1	2011	5.8
28	0326	-.7	1006	3.4	1416	2.2	2044	5.8
29	0400	-.7	1048	3.3	1448	2.4	2114	5.6
30	0436	-.6	1129	3.2	1520	2.5	2148	5.4
31	0515	-.4	1216	3.2	1559	2.6	2222	5.2

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
MAY 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0501	-.4	1129	2.8	1550	2.0	2203	4.7
2	0547	-.1	1228	2.6	1617	2.2	2238	4.4
3	0637	.1	1351	2.6	1646	2.5	2320	4.0
4	0733	.4	1530	2.7	1751	2.6	----	---
5	0016	3.8	0840	.4	1629	2.9	2010	2.7
6	0135	3.4	0937	.5	1658	3.2	2207	2.4
7	0308	3.3	1026	.6	1722	3.5	2316	1.9
8	0428	3.3	1108	.7	1745	3.9	0002	1.3*
9	0534	3.3	1144	.8	1807	4.3	----	---
10	0044	.7	0631	3.3	1218	.9	1832	4.7
11	0125	0.0	0722	3.4	1254	1.1	1904	5.1
12	0204	-.5	0811	3.5	1326	1.1	1936	5.5
13	0249	-1.0	0903	3.5	1404	1.3	2015	5.7
14	0332	-1.3	0953	3.4	1446	1.5	2055	5.8
15	0421	-1.4	1049	3.3	1528	1.8	2140	5.7
16	0515	-1.3	1149	3.2	1620	1.9	2231	5.5
17	0611	-1.1	1256	3.2	1723	2.1	2328	5.0
18	0711	-.8	1405	3.3	1844	2.3	----	---
19	0034	4.5	0812	-.4	1512	3.5	2025	2.2
20	0155	4.0	0912	-.1	1607	3.9	2203	1.8
21	0325	3.6	1010	.3	1653	4.2	2319	1.2
22	0447	3.3	1058	.6	1734	4.6	----	---
23	0019	.6	0601	3.3	1143	.9	1809	4.8
24	0107	.2	0704	3.2	1222	1.2	1841	5.0
25	0149	-.2	0754	3.2	1257	1.5	1909	5.2
26	0228	-.4	0842	3.2	1329	1.7	1941	5.2
27	0303	-.6	0923	3.1	1357	1.8	2008	5.2
28	0339	-.6	1003	3.1	1429	1.9	2041	5.2
29	0413	-.6	1045	3.0	1501	2.1	2111	5.0
30	0449	-.5	1126	2.9	1533	2.2	2145	4.8
31	0528	-.4	1213	2.9	1612	2.4	2219	4.7

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
JUNE 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0554	-.2	1308	3.2	1645	2.7	2301	4.8
2	0635	.1	1357	3.4	1750	2.8	2344	4.4
3	0718	.4	1446	3.6	1916	2.8	----	---
4	0037	3.9	0800	.7	1528	3.9	2057	2.5
5	0202	3.5	0846	1.0	1603	4.2	2221	2.1
6	0336	3.2	0932	1.2	1639	4.7	2320	1.3
7	0504	3.1	1020	1.5	1714	5.2	----	---
8	0011	.6	0617	3.2	1106	1.7	1751	5.7
9	0057	-.2	0720	3.4	1153	1.8	1830	6.2
10	0142	-.9	0814	3.5	1240	1.9	1915	6.6
11	0228	-1.4	0907	3.7	1329	2.0	2000	6.9
12	0314	-1.7	0956	3.8	1418	2.0	2048	6.9
13	0401	-1.8	1046	3.9	1511	2.1	2137	6.8
14	0448	-1.7	1138	4.0	1609	2.1	2226	6.4
15	0538	-1.3	1231	4.1	1713	2.2	2321	5.8
16	0627	-.8	1323	4.3	1827	2.2	----	---
17	0024	5.0	0716	-.3	1418	4.5	1952	2.1
18	0133	4.2	0806	.4	1511	4.8	2125	1.8
19	0259	3.6	0856	1.0	1602	5.1	2248	1.2
20	0437	3.2	0952	1.5	1650	5.3	2357	.7
21	0604	3.1	1044	1.9	1733	5.5	----	---
22	0046	.2	0715	3.2	1130	2.2	1813	5.7
23	0131	-.2	0811	3.3	1215	2.4	1849	5.8
24	0210	-.4	0853	3.4	1254	2.5	1924	5.9
25	0242	-.6	0929	3.4	1330	2.5	1956	5.9
26	0316	-.6	1001	3.5	1405	2.5	2028	5.9
27	0345	-.6	1032	3.5	1440	2.5	2100	5.9
28	0417	-.5	1105	3.6	1516	2.5	2135	5.7
29	0446	-.4	1137	3.7	1555	2.5	2207	5.4
30	0518	-.2	1211	3.8	1638	2.5	2242	5.0

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
JUNE 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0607	-.2	1305	2.9	1658	2.5	2258	4.3
2	0648	.1	1354	3.1	1803	2.6	2341	4.0
3	0731	.4	1443	3.3	1929	2.6	----	---
4	0034	3.5	0813	.6	1525	3.5	2110	2.3
5	0159	3.2	0859	.9	1600	3.8	2234	1.8
6	0333	2.9	0945	1.1	1636	4.2	2333	1.1
7	0501	2.8	1033	1.3	1711	4.7	----	---
8	0024	.5	0614	2.9	1119	1.5	1748	5.1
9	0110	-.2	0717	3.1	1206	1.6	1827	5.5
10	0155	-.8	0811	3.2	1253	1.7	1912	5.9
11	0241	-1.2	0904	3.3	1342	1.8	1957	6.2
12	0327	-1.5	0953	3.4	1431	1.8	2045	6.2
13	0414	-1.6	1043	3.5	1524	1.8	2134	6.1
14	0501	-1.5	1135	3.6	1622	1.8	2223	5.7
15	0551	-1.1	1228	3.7	1726	1.9	2318	5.2
16	0640	-.7	1320	3.9	1840	1.9	----	---
17	0021	4.5	0729	-.3	1415	4.0	2005	1.8
18	0130	3.8	0819	.4	1508	4.3	2138	1.6
19	0256	3.3	0909	.9	1559	4.6	2301	1.1
20	0434	2.9	1005	1.3	1647	4.8	0010	.6*
21	0601	2.8	1057	1.7	1730	4.9	----	---
22	0059	.2	0712	2.9	1143	1.9	1810	5.1
23	0144	-.2	0808	3.0	1228	2.1	1846	5.2
24	0223	-.4	0850	3.1	1307	2.2	1921	5.3
25	0255	-.5	0926	3.1	1343	2.2	1953	5.3
26	0329	-.5	0958	3.2	1418	2.2	2025	5.3
27	0358	-.5	1029	3.2	1453	2.2	2057	5.3
28	0430	-.4	1102	3.3	1529	2.2	2132	5.1
29	0459	-.4	1134	3.3	1608	2.2	2204	4.8
30	0531	-.2	1208	3.4	1651	2.3	2239	4.5

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
JULY 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0550	.1	1244	3.9	1731	2.5	2321	4.5
2	0619	.5	1322	4.1	1839	2.5	0010	4.0*
3	0651	.9	1402	4.3	2002	2.3	----	---
4	0116	3.4	0730	1.3	1447	4.6	2133	1.9
5	0258	2.9	0812	1.7	1534	5.0	2251	1.2
6	0453	2.8	0911	2.1	1626	5.4	2353	.4
7	0622	3.0	1023	2.3	1716	5.9	----	---
8	0045	-.3	0726	3.3	1129	2.4	1809	6.4
9	0134	-1.0	0817	3.6	1225	2.3	1902	6.8
10	0219	-1.4	0900	3.9	1321	2.1	1951	7.1
11	0302	-1.7	0942	4.1	1416	1.9	2039	7.1
12	0345	-1.7	1021	4.4	1511	1.8	2129	6.9
13	0427	-1.4	1105	4.6	1604	1.7	2217	6.4
14	0507	-1.0	1147	4.8	1702	1.7	2310	5.7
15	0548	-.4	1230	4.9	1807	1.7	0003	4.8*
16	0627	.3	1319	5.0	1920	1.7	----	---
17	0108	4.0	0711	1.1	1410	5.1	2052	1.6
18	0234	3.2	0754	1.7	1506	5.1	2222	1.2
19	0429	2.9	0849	2.3	1603	5.2	2337	.8
20	0622	3.0	0950	2.5	1659	5.3	----	---
21	0036	.4	0731	3.2	1108	2.7	1751	5.5
22	0119	.1	0814	3.4	1204	2.7	1833	5.7
23	0156	-.2	0845	3.6	1246	2.6	1910	5.8
24	0226	-.3	0910	3.7	1326	2.5	1947	6.0
25	0256	-.4	0932	3.8	1358	2.4	2019	6.0
26	0321	-.4	0957	4.0	1434	2.3	2048	6.0
27	0347	-.3	1022	4.1	1510	2.2	2120	5.8
28	0412	-.2	1044	4.2	1545	2.1	2152	5.5
29	0436	.1	1112	4.4	1628	2.0	2227	5.1
30	0502	.4	1138	4.5	1713	2.0	2305	4.5
31	0527	.9	1210	4.7	1810	2.0	2352	3.9

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
JULY 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0603	.1	1241	3.5	1744	2.3	2318	4.0
2	0632	.4	1319	3.7	1852	2.3	0007	3.6*
3	0704	.8	1359	3.9	2015	2.0	----	---
4	0113	3.1	0743	1.1	1444	4.1	2146	1.7
5	0255	2.6	0825	1.5	1531	4.5	2304	1.1
6	0450	2.6	0924	1.8	1623	4.8	0006	.4*
7	0619	2.7	1036	2.0	1713	5.3	----	---
8	0058	-.3	0723	3.0	1142	2.1	1806	5.7
9	0147	-.9	0814	3.3	1238	2.0	1859	6.1
10	0232	-1.2	0857	3.5	1334	1.8	1948	6.3
11	0315	-1.5	0939	3.7	1429	1.7	2036	6.3
12	0358	-1.5	1018	4.0	1524	1.6	2126	6.2
13	0440	-1.2	1102	4.1	1617	1.5	2214	5.7
14	0520	-.9	1144	4.3	1715	1.5	2307	5 1
15	0601	-.4	1227	4.4	1820	1.5	0000	4.3*
16	0640	.3	1316	4.5	1933	1.5	----	---
17	0105	3.6	0724	1.0	1407	4.6	2105	1.4
18	0231	2.9	0807	1.5	1503	4.6	2235	1.1
19	0426	2.6	0902	2.0	1600	4.7	2350	.7
20	0619	2.7	1011	2.3	1656	4.8	----	---
21	0049	.4	0728	2.9	1121	2.5	1748	4.9
22	0132	.1	0811	3.1	1217	2.5	1830	5.1
23	0209	-.2	0842	3.3	1259	2.4	1907	5.2
24	0239	-.3	0907	3.3	1339	2.2	1944	5.4
25	0309	-.4	0929	3.4	1411	2.1	2016	5.4
26	0334	-.4	0954	3.6	1447	2.0	2045	5.4
27	0400	-.3	1019	3.7	1523	1.9	2117	5.2
28	0425	-.2	1041	3.8	1558	1.8	2149	4.9
29	0449	.1	1109	4.0	1641	1.8	2224	4.6
30	0515	.4	1135	4.0	1726	1.8	2302	4.0
31	0540	.8	1207	4.2	1823	1.8	2349	3.5

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
AUGUST 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0552	1.3	1248	4.8	1922	1.9	----	---
2	0059	3.3	0624	1.8	1336	5.0	2056	1.6
3	0251	2.8	0706	2.3	1438	5.2	2232	1.0
4	0522	2.8	0818	2.6	1551	5.5	2341	.3
5	0642	3.2	1005	2.7	1659	5.9	----	---
6	0033	-.3	0724	3.6	1124	2.5	1801	6.4
7	0121	-.9	0803	4.0	1228	2.3	1854	6.8
8	0202	-1.2	0838	4.3	1322	1.9	1945	7.0
9	0241	-1.3	0910	4.7	1415	1.5	2034	6.9
10	0318	-1.1	0945	5.0	1504	1.2	2120	6.6
11	0353	-.8	1020	5.2	1553	1.0	2205	6.0
12	0428	-.2	1056	5.4	1646	1.0	2254	5.3
13	0501	.4	1134	5.4	1742	1.1	2346	4.5
14	0533	1.1	1214	5.3	1848	1.3	----	---
15	0045	3.7	0609	1.8	1301	5.2	2007	1.4
16	0218	3.1	0647	2.4	1400	5.0	2149	1.3
17	0454	2.9	0736	2.8	1511	4.9	2316	1.0
18	0647	3.2	0933	3.1	1628	5.0	----	---
19	0014	.6	0732	3.5	1106	3.0	1732	5.2
20	0054	.3	0751	3.7	1201	2.8	1818	5.4
21	0127	.1	0812	3.9	1244	2.5	1854	5.7
22	0158	0.0	0831	4.1	1316	2.3	1929	5.8
23	0223	-.1	0852	4.3	1351	2.0	2004	5.9
24	0243	-.1	0908	4.5	1423	1.7	2034	5.8
25	0307	.1	0930	4.7	1456	1.5	2104	5.6
26	0330	.3	0951	4.9	1531	1.3	2139	5.3
27	0350	.6	1016	5.1	1610	1.2	2217	4.8
28	0414	1.0	1043	5.2	1656	1.2	2257	4.3
29	0437	1.4	1113	5.3	1748	1.2	2352	3.7
30	0502	1.9	1152	5.3	1900	1.2	----	---
31	0111	3.1	0534	2.4	1245	5.2	2033	1.1

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
AUGUST 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0605	1.1	1245	4.3	1935	1.7	----	---
2	0056	3.0	0637	1.6	1333	4.5	2109	1.4
3	0248	2.6	0719	2.0	1435	4.7	2245	.9
4	0519	2.6	0831	2.4	1548	4.9	2354	.3
5	0639	2.9	1018	2.5	1656	5.3	----	---
6	0046	-.3	0721	3.3	1137	2.3	1758	5.7
7	0134	-.8	0800	3.6	1241	2.0	1851	6.1
8	0215	-1.1	0835	3.9	1335	1.7	1942	6.2
9	0254	-1.1	0907	4.2	1428	1.3	2031	6.2
10	0331	-1.0	0942	4.5	1517	1.1	2117	5.9
11	0406	-.7	1017	4.7	1606	.9	2202	5.4
12	0441	-.2	1053	4.8	1659	.9	2251	4.8
13	0514	.4	1131	4.8	1755	1.0	2343	4.0
14	0546	1.0	1211	4.8	1901	1.1	----	---
15	0042	3.3	0622	1.6	1258	4.7	2020	1.2
16	0215	2.8	0700	2.1	1357	4.5	2202	1.1
17	0451	2.6	0749	2.6	1508	4.4	2329	.9
18	0644	2.9	0946	2.8	1625	4.5	----	---
19	0027	.5	0729	3.2	1119	2.7	1729	4.7
20	0107	.3	0748	3.3	1214	2.6	1815	4.8
21	0140	.1	0809	3.5	1257	2.3	1851	5.1
22	0211	0.0	0828	3.7	1329	2.0	1926	5.2
23	0236	-.1	0849	3.9	1404	1.8	2001	5.3
24	0256	-.1	0905	4.0	1436	1.5	2031	5.2
25	0320	.1	0927	4.2	1509	1.3	2101	5.0
26	0343	.3	0948	4.4	1544	1.1	2136	4.8
27	0403	.5	1013	4.6	1623	1.1	2214	4.3
28	0427	.9	1040	4.7	1709	1.1	2254	3.9
29	0450	1.2	1110	4.8	1801	1.1	2349	3.3
30	0515	1.7	1149	4.8	1913	1.1	----	---
31	0108	2.8	0547	2.1	1242	4.7	2046	1.0

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
SEPTEMBER 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0341	2.9	0604	2.7	1401	5.2	2213	.7
2	0551	3.2	0820	3.0	1534	5.4	2324	.2
3	0633	3.6	1026	2.9	1650	5.7	----	---
4	0014	-.3	0705	4.0	1139	2.5	1756	6.1
5	0057	-.6	0734	4.5	1236	1.9	1849	6.4
6	0135	-.7	0804	4.9	1324	1.3	1940	6.4
7	0211	-.6	0834	5.3	1411	.8	2026	6.3
8	0243	-.3	0906	5.6	1456	.5	2111	5.9
9	0315	.1	0937	5.8	1539	.3	2153	5.4
10	0347	.6	1008	5.8	1627	.4	2239	4.7
11	0416	1.2	1040	5.7	1713	.6	2329	4.1
12	0444	1.8	1116	5.5	1812	.8	----	---
13	0032	3.5	0509	2.4	1155	5.2	1924	1.1
14	0217	3.0	0534	2.8	1245	4.8	2100	1.2
15	1405	4.6	2231	1.1	----	---	----	---
16	0638	3.5	0927	3.3	1544	4.6	2332	.8
17	0650	3.8	1101	3.1	1700	4.8	----	---
18	0014	.6	0712	4.0	1151	2.7	1753	5.0
19	0047	.4	0726	4.2	1230	2.3	1834	5.2
20	0112	.3	0742	4.5	1302	1.9	1910	5.3
21	0134	.3	0800	4.8	1334	1.4	1942	5.4
22	0159	.4	0819	5.1	1406	1.0	2020	5.3
23	0221	.6	0839	5.4	1441	.7	2052	5.1
24	0243	.9	0902	5.6	1516	.4	2131	4.8
25	0308	1.2	0929	5.8	1558	.3	2214	4.4
26	0333	1.6	0958	5.8	1643	.3	2303	3.9
27	0402	2.0	1033	5.8	1739	.4	0010	3.4*
28	0430	2.4	1118	5.6	1849	.5	----	---
29	0148	3.1	0509	2.7	1216	5.4	2018	.5
30	0413	3.2	0628	3.1	1340	5.2	2146	.4

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
SEPTEMBER 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0338	2.6	0617	2.5	1358	4.7	2226	.6
2	0548	2.9	0833	2.7	1531	4.8	2337	.2
3	0630	3.3	1039	2.6	1647	5.1	----	---
4	0027	-.3	0702	3.6	1152	2.2	1753	5.5
5	0110	-.5	0731	4.0	1249	1.7	1846	5.7
6	0148	-.6	0801	4.4	1337	1.1	1937	5.7
7	0224	-.5	0831	4.8	1424	.7	2023	5.6
8	0256	-.3	0903	5.0	1509	.4	2108	5.3
9	0328	.1	0934	5.2	1552	.3	2150	4.8
10	0400	.5	1005	5.2	1640	.4	2236	4.2
11	0429	1.1	1037	5.1	1726	.5	2326	3.7
12	0457	1.6	1113	4.9	1825	.7	----	---
13	0029	3.2	0522	2.1	1152	4.7	1937	1.0
14	0214	2.7	0547	2.6	1242	4.3	2113	1.1
15	1402	4.1	2244	1.0	----	---	----	---
16	0635	3.2	0940	3.0	1541	4.1	2345	.7
17	0647	3.4	1114	2.8	1657	4.3	----	---
18	0027	.5	0709	3.6	1204	2.5	1750	4.5
19	0100	.4	0723	3.8	1243	2.0	1831	4.7
20	0125	.3	0739	4.0	1315	1.7	1907	4.8
21	0147	.3	0757	4.3	1347	1.2	1939	4.8
22	0212	.4	0816	4.6	1419	.9	2017	4.8
23	0234	.5	0836	4.8	1454	.6	2049	4.6
24	0256	.8	0859	5.0	1529	.4	2128	4.3
25	0321	1.1	0926	5.2	1611	.3	2211	4.0
26	0346	1.4	0955	5.2	1656	.3	2300	3.5
27	0415	1.8	1030	5.2	1752	.4	0007	3.1*
28	0443	2.1	1115	5.0	1902	.4	----	---
29	0145	2.8	0522	2.5	1213	4.8	2031	.4
30	0410	2.9	0641	2.8	1337	4.7	2159	.4

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
OCTOBER 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0522	3.7	0909	3.1	1522	5.1	2253	.1
2	0601	4.1	1042	2.6	1642	5.3	2343	-.1
3	0630	4.6	1146	2.0	1748	5.5	----	---
4	0025	-.1	0658	5.1	1238	1.3	1844	5.6
5	0100	0.0	0729	5.5	1324	.7	1932	5.5
6	0136	.2	0758	5.9	1405	.2	2018	5.3
7	0206	.6	0826	6.1	1447	-.1	2102	5.0
8	0236	1.0	0855	6.2	1527	-.2	2147	4.6
9	0305	1.5	0923	6.1	1609	-.2	2231	4.1
10	0333	1.9	0956	5.9	1651	.1	2323	3.7
11	0358	2.3	1024	5.6	1742	.4	----	---
12	0029	3.3	0420	2.6	1100	5.2	1842	.7
13	0210	3.1	0436	3.0	1146	4.8	2001	.9
14	1253	4.4	2124	1.0	----	---	----	---
15	0553	3.6	0900	3.4	1438	4.2	2226	.9
16	0601	3.9	1039	3.0	1607	4.2	2316	.8
17	0617	4.2	1133	2.5	1714	4.4	2348	.8
18	0633	4.5	1210	2.0	1802	4.5	----	---
19	0016	.8	0652	4.8	1247	1.5	1844	4.6
20	0042	.9	0710	5.2	1318	.9	1926	4.6
21	0110	1.0	0732	5.6	1353	.4	2006	4.6
22	0135	1.2	0754	5.9	1429	-.1	2049	4.5
23	0200	1.4	0822	6.2	1508	-.4	2131	4.3
24	0232	1.7	0854	6.4	1550	-.6	2217	4.0
25	0304	2.0	0930	6.4	1639	-.6	2318	3.7
26	0339	2.3	1011	6.2	1734	-.4	----	---
27	0028	3.5	0421	2.6	1102	5.9	1840	-.2
28	0201	3.4	0521	2.9	1204	5.5	1954	0.0
29	0330	3.7	0717	3.1	1327	5.0	2106	.1
30	0429	4.1	0916	2.8	1503	4.7	2209	.2
31	0514	4.6	1047	2.2	1629	4.6	2301	.3

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
OCTOBER 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0519	3.3	0922	2.8	1519	4.6	2306	.1
2	0558	3.7	1055	2.4	1639	4.8	2356	-.1
3	0627	4.1	1159	1.8	1745	4.9	----	---
4	0038	-.1	0655	4.6	1251	1.1	1841	5.0
5	0113	0.0	0726	4.9	1337	.6	1929	4.9
6	0149	.2	0755	5.3	1418	.2	2015	4.8
7	0219	.5	0823	5.5	1500	-.1	2059	4.5
8	0249	.9	0852	5.5	1540	-.2	2144	4.1
9	0318	1.3	0920	5.5	1622	-.2	2228	3.7
10	0346	1.7	0953	5.3	1704	.1	2320	3.3
11	0411	2.0	1021	5.0	1755	.4	----	---
12	0026	3.0	0433	2.4	1057	4.7	1855	.6
13	0207	2.8	0449	2.7	1143	4.3	2014	.8
14	1250	4.0	2137	.9	----	---	----	---
15	0550	3.3	0913	3.1	1435	3.8	2239	.8
16	0558	3.5	1052	2.7	1604	3.8	2329	.7
17	0614	3.8	1146	2.3	1711	4.0	0001	.7*
18	0630	4.0	1223	1.8	1759	4.0	----	---
19	0029	.7	0649	4.3	1300	1.3	1841	4.1
20	0055	.8	0707	4.7	1331	.8	1923	4.1
21	0123	.9	0729	5.0	1406	.4	2003	4.1
22	0148	1.1	0751	5.3	1442	-.1	2046	4.0
23	0213	1.2	0819	5.5	1521	-.4	2128	3.9
24	0245	1.5	0851	5.7	1603	-.5	2214	3.6
25	0317	1.8	0927	5.7	1652	-.5	2315	3.3
26	0352	2.0	1008	5.5	1747	-.4	----	---
27	0025	3.2	0434	2.4	1059	5.3	1853	-.2
28	0158	3.1	0534	2.6	1201	4.9	2007	0.0
29	0327	3.3	0730	2.8	1324	4.5	2119	.1
30	0426	3.7	0929	2.6	1500	4.2	2222	.2
31	0511	4.1	1100	1.9	1626	4.1	2314	.3

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
NOVEMBER 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0549	5.1	1147	1.5	1740	4.6	2343	.6
2	0622	5.5	1236	.7	1841	4.6	----	---
3	0022	.8	0654	5.9	1322	.1	1932	4.5
4	0058	1.1	0723	6.2	1401	-.3	2018	4.3
5	0128	1.5	0752	6.3	1439	-.5	2104	4.2
6	0200	1.8	0822	6.3	1518	-.6	2148	4.0
7	0229	2.1	0852	6.2	1556	-.5	2233	3.7
8	0257	2.3	0921	6.0	1636	-.3	2323	3.5
9	0323	2.5	0953	5.7	1721	0.0	----	---
10	0021	3.3	0348	2.8	1028	5.4	1808	.3
11	0141	3.3	0430	3.0	1107	4.9	1903	.6
12	0307	3.4	0534	3.3	1200	4.5	2003	.8
13	0413	3.6	0749	3.3	1315	4.1	2103	.9
14	0447	3.9	0954	3.0	1451	3.7	2153	1.1
15	0510	4.2	1100	2.5	1618	3.6	2235	1.2
16	0532	4.6	1146	1.8	1724	3.7	2311	1.3
17	0556	5.0	1224	1.1	1825	3.8	2345	1.5
18	0620	5.5	1300	.4	1914	3.9	----	---
19	0018	1.6	0649	5.9	1338	-.2	2000	3.9
20	0053	1.8	0721	6.3	1420	-.7	2047	4.0
21	0128	1.9	0755	6.6	1502	-1.1	2135	3.9
22	0204	2.0	0834	6.8	1544	-1.3	2228	3.8
23	0246	2.2	0916	6.8	1635	-1.2	2321	3.8
24	0335	2.4	1004	6.5	1726	-1.1	----	---
25	0023	3.8	0433	2.5	1054	6.1	1821	-.7
26	0128	3.9	0546	2.7	1156	5.5	1920	-.3
27	0234	4.1	0721	2.7	1309	4.8	2020	.1
28	0333	4.5	0906	2.4	1441	4.2	2119	.5
29	0422	4.9	1033	1.7	1615	3.8	2212	.9
30	0508	5.3	1140	1.0	1737	3.7	2303	1.3

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
NOVEMBER 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0546	4.6	1200	1.3	1737	4.1	2356	.5
2	0619	4.9	1249	.6	1838	4.1	----	---
3	0035	.7	0651	5.3	1335	.1	1929	4.0
4	0111	1.0	0720	5.5	1414	-.3	2015	3.9
5	0141	1.3	0749	-.6	1452	-.4	2101	3.8
6	0213	1.6	0819	5.6	1531	-.5	2145	3.6
7	0242	1.8	0849	5.5	1609	-.4	2230	3.3
8	0310	2.0	0918	5.4	1649	-.3	2320	3.2
9	0336	2.3	0950	5.1	1734	0.0	----	---
10	0018	3.0	0401	2.6	1025	4.8	1821	.3
11	0138	3.0	0443	2.7	1104	4.4	1916	.5
12	0304	3.1	0547	3.0	1157	4.0	2016	.7
13	0410	3.3	0802	3.0	1312	3.7	2116	.8
14	0444	3.5	1007	2.7	1448	3.3	2206	1.0
15	0507	3.8	1113	2.2	1615	3.3	2248	1.1
16	0529	4.1	1159	1.6	1721	3.3	2324	1.1
17	0553	4.5	1237	1.0	1822	3.4	2358	1.3
18	0617	4.9	1313	.4	1911	3.5	----	---
19	0031	1.4	0646	5.3	1351	-.2	1957	3.5
20	0106	1.6	0718	5.6	1433	-.6	2044	3.6
21	0141	1.7	0752	5.9	1515	-1.0	2132	3.5
22	0217	1.8	0831	6.1	1557	-1.1	2225	3.4
23	0259	1.9	0913	6.1	1648	-1.1	2318	3.4
24	0348	2.1	1001	5.8	1739	-1.0	----	---
25	0020	3.4	0446	2.3	1051	5.5	1834	-.6
26	0125	3.5	0559	2.5	1153	4.9	1933	-.3
27	0231	3.7	0734	2.5	1306	4.3	2033	.1
28	0330	4.0	0919	2.1	1438	3.8	2132	.4
29	0419	4.4	1046	1.5	1612	3.4	2225	.8
30	0505	4.8	1153	.9	1734	3.3	2316	1.1

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
DECEMBER 1991
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0546	5.7	1235	.3	1846	3.7	2346	1.6
2	0622	6.0	1320	-.2	1943	3.7	----	---
3	0024	1.9	0656	6.2	1359	-.5	2032	3.7
4	0103	2.1	0728	6.2	1437	-.7	2111	3.7
5	0135	2.3	0800	6.2	1513	-.8	2153	3.7
6	0207	2.4	0832	6.2	1548	-.7	2232	3.6
7	0239	2.5	0903	6.0	1622	-.6	2310	3.5
8	0312	2.5	0937	5.8	1657	-.4	2352	3.5
9	0349	2.6	1009	5.5	1734	-.1	----	---
10	0038	3.5	0431	2.8	1043	5.1	1813	.2
11	0127	3.6	0526	2.9	1123	4.6	1850	.5
12	0216	3.7	0645	2.9	1213	4.0	1933	.9
13	0301	3.9	0830	2.7	1325	3.5	2016	1.2
14	0340	4.3	1004	2.3	1508	3.1	2105	1.6
15	0422	4.6	1117	1.7	1650	3.0	2154	1.8
16	0458	5.1	1201	.9	1812	3.1	2242	2.0
17	0537	5.6	1248	.1	1914	3.3	2332	2.1
18	0615	6.1	1330	-.6	2003	3.5	----	---
19	0020	2.2	0657	6.5	1412	-1.1	2049	3.7
20	0109	2.1	0740	6.9	1454	-1.5	2134	3.9
21	0156	2.1	0825	7.0	1538	-1.7	2220	4.0
22	0247	2.0	0911	7.0	1620	-1.7	2305	4.1
23	0340	2.0	0959	6.7	1707	-1.4	2354	4.2
24	0436	2.1	1051	6.1	1752	-.9	----	---
25	0043	4.4	0546	2.1	1147	5.3	1839	-.3
26	0135	4.6	0707	2.1	1253	4.5	1927	.3
27	0231	4.8	0842	1.8	1415	3.7	2020	1.0
28	0326	5.0	1016	1.3	1602	3.2	2115	1.6
29	0421	5.3	1130	.7	1745	3.1	2214	2.0
30	0511	5.5	1233	.2	1905	3.2	2313	2.3
31	0556	5.7	1318	-.3	2001	3.4	----	---

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
DECEMBER 1991
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0543	5.1	1248	.3	1843	3.3	2359	1.4
2	0619	5.4	1333	-.2	1940	3.3	----	---
3	0037	1.7	0653	5.5	1412	-.4	2029	3.3
4	0116	1.8	0725	5.5	1450	-.6	2108	3.3
5	0148	2.0	0757	5.5	1526	-.7	2150	3.3
6	0220	2.1	0829	5.5	1601	-.6	2229	3.3
7	0252	2.2	0900	5.4	1635	-.5	2307	3.2
8	0325	2.3	0934	5.2	1710	-.4	2349	3.2
9	0402	2.4	1006	4.9	1747	-.1	----	---
10	0035	3.2	0444	2.6	1040	4.6	1826	.2
11	0124	3.3	0539	2.6	1120	4.1	1903	.4
12	0213	3.3	0658	2.6	1210	3.6	1946	.8
13	0258	3.5	0843	2.5	1322	3.2	2029	1.1
14	0337	3.9	1017	2.0	1505	2.8	2118	1.4
15	0419	4.1	1130	1.5	1647	2.7	2207	1.6
16	0455	4.6	1214	.8	1809	2.8	2255	1.8
17	0534	5.0	1301	.1	1911	3.0	2345	1.8
18	0612	5.5	1343	-.5	2000	3.2	----	---
19	0033	1.9	0654	5.8	1425	-1.0	2046	3.3
20	0122	1.8	0737	6.2	1507	-1.3	2131	3.5
21	0209	1.8	0822	6.2	1551	-1.5	2217	3.6
22	0300	1.8	0908	6.2	1633	-1.5	2302	3.7
23	0353	1.8	0956	6.0	1720	-1.2	2351	3.8
24	0449	1.8	1048	5.5	1805	-.8	----	---
25	0040	4.0	0559	1.8	1144	4.8	1852	-.3
26	0132	4.1	0720	1.8	1250	4.0	1940	.3
27	0228	4.3	0855	1.6	1412	3.3	2033	.9
28	0323	4.5	1029	1.1	1559	2.9	2128	1.4
29	0418	4.8	1143	.6	1742	2.8	2227	1.8
30	0508	4.9	1246	.2	1902	2.9	2326	2.0
31	0553	5.1	1331	-.3	1958	3.1	----	---

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

Latitude 22° 02' N
Longitude 159 47 W

Barking Sands Training Area, Kauai, Hawaiian Islands
Moonrise and Moonset for 1991

Hawaii-Aleutian Standard Time

Nautical Almanac Office
U.S. Naval Observatory
Washington, D.C. 20392-5100

Day	Jan. Rise	Jan. Set	Feb. Rise	Feb. Set	Mar. Rise	Mar. Set	Apr. Rise	Apr. Set	May Rise	May Set	June Rise	June Set	July Rise	July Set	Aug. Rise	Aug. Set	Sept. Rise	Sept. Set	Oct. Rise	Oct. Set	Nov. Rise	Nov. Set	Dec. Rise	Dec. Set
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	1936	0817	2120	0857	2001	0727	2130	0753	2201	0803	2254	0925	2239	0955	2301	1122		1318	0018	1404	0220	1454	0305	1447
2	2042	0906	2216	0933	2056	0803	2225	0835	2250	0853	2330	1017	2312	1046	2343	1220	0018	1420	0123	1452	0317	1531	0401	1526
3	2143	0949	2310	1008	2152	0840	2318	0921	2336	0945		1109	2346	1138		1321	0121	1517	0226	1536	0414	1609	0457	1609
4	2240	1027		1045	2247	0918		1009		1038	0004	1200		1232	0032	1424	0227	1610	0327	1617	0511	1648	0553	1655
5	2335	1103	0004	1123	2342	0958	0009	1101	0017	1131	0038	1252	0022	1329	0127	1529	0333	1657	0427	1655	0608	1729	0648	1744
6		1137	0058	1203		1041	0057	1153	0055	1224	0112	1346	0103	1430	0229	1631	0438	1741	0526	1733	0705	1813	0740	1836
7	0028	1212	0152	1247	0036	1128	0141	1247	0131	1316	0148	1443	0149	1534	0336	1728	0541	1821	0624	1812	0801	1901	0829	1928
8	0121	1248	0245	1335	0128	1217	0221	1340	0206	1409	0227	1543	0242	1640	0444	1820	0641	1900	0722	1852	0856	1951	0914	2021
9	0214	1326	0336	1426	0218	1310	0259	1434	0241	1503	0311	1647	0342	1746	0552	1907	0740	1939	0820	1935	0947	2043	0955	2113
10	0307	1407	0425	1519	0304	1403	0335	1527	0316	1600	0402	1755	0449	1848	0657	1949	0839	2018	0917	2021	1035	2136	1033	2204
11	0400	1453	0510	1613	0347	1457	0410	1622	0354	1659	0500	1903	0558	1944	0759	2029	0936	2059	1013	2109	1118	2229	1108	2254
12	0452	1541	0552	1708	0427	1552	0446	1718	0436	1803	0605	2007	0708	2033	0859	2107	1034	2142	1106	2200	1158	2320	1141	2344
13	0543	1633	0631	1802	0504	1646	0523	1817	0524	1910	0713	2106	0814	2117	0957	2145	1130	2229	1156	2252	1235		1214	
14	0630	1727	0707	1856	0540	1740	0603	1918	0619	2018	0822	2158	0917	2157	1054	2224	1224	2318	1241	2345	1309	0011	1247	0035
15	0714	1821	0742	1950	0615	1835	0647	2023	0720	2124	0929	2243	1016	2235	1150	2305	1315		1323		1343	0102	1323	0127
16	0754	1916	0816	2045	0651	1932	0737	2130	0826	2225	1032	2324	1113	2311	1245	2349	1403	0009	1402	0038	1416	0153	1401	0222
17	0838	2009	0852	2141	0728	2031	0833	2235	0933	2318	1131		1209	2348	1340		1447	0101	1438	0129	1452	0246	1445	0320
18	0907	2102	0929	2239	0809	2133	0935	2337	1039		1227	0001	1304		1433	0035	1528	0154	1512	0221	1529	0340	1535	0422
19	0941	2155	1010	2341	0854	2237	1039		1142	0005	1322	0037	1359	0027	1522	0125	1606	0247	1547	0313	1611	0438	1633	0527
20	1015	2249	1056		0945	2341	1144	0034	1241	0047	1416	0112	1453	0108	1609	0216	1641	0339	1621	0405	1659	0540	1737	0633
21	1050	2346	1148	0044	1041		1248	0123	1338	0125	1510	0149	1547	0152	1652	0309	1716	0431	1658	0459	1753	0645	1845	0736
22	1128		1246	0148	1142	0044	1348	0207	1432	0201	1604	0228	1638	0240	1731	0402	1750	0523	1738	0556	1854	0750	1954	0833
23	1210	0045	1349	0251	1246	0144	1446	0247	1526	0236	1658	0310	1727	0330	1808	0455	1825	0616	1822	0656	1959	0854	2101	0925
24	1259	0147	1454	0349	1351	0237	1541	0324	1620	0311	1751	0355	1812	0422	1842	0547	1902	0711	1912	0758	2106	0953	2205	1011
25	1354	0253	1600	0442	1453	0325	1636	0359	1714	0349	1842	0443	1853	0515	1916	0639	1942	0808	2007	0903	2212	1046	2305	1053
26	1456	0358	1704	0529	1554	0408	1730	0435	1809	0428	1930	0535	1932	0608	1950	0731	2027	0908	2108	1006	2315	1133		1132
27	1603	0502	1805	0612	1652	0447	1825	0511	1903	0511	2013	0627	2007	0700	2025	0824	2118	1010	2212	1106		1216	0004	1209
28	1712	0600	1904	0651	1748	0524	1920	0549	1956	0558	2054	0720	2041	0752	2102	0918	2214	1112	2317	1201	0015	1255	0100	1247
29	1819	0652			1844	0600	2015	0630	2046	0648	2131	0813	2114	0843	2143	1015	2315	1214		1251	0113	1332	0156	1326
30	1922	0738			1939	0636	2109	0715	2132	0739	2205	0904	2148	0935	2229	1114		1311	0020	1335	0209	1409	0252	1408
31	2023	0819			2034	0713			2215	0832			2223	1027	2321	1216			0121	1416			0348	1453

PORT ALLEN TIDES
JANUARY 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0406	2.3	1137	0.0	1613	.6	2136	-.1
2	0447	2.1	1215	0.0	1709	.7	2229	0.0
3	0527	2.0	1251	0.0	1813	.8	2324	.3
4	0609	1.7	1330	0.0	1919	.9	----	---
5	0023	.4	0645	1.4	1407	0.0	2033	1.0
6	0143	.6	0723	1.2	1443	.1	2149	1.2
7	0331	.8	0759	1.0	1521	.1	2257	1.3
8	0555	.7	0845	.8	1602	.1	----	---
9	2353	1.4*	0744	.5	0953	.6	1644	.1
10	0039	1.6	0844	.4	1119	.5	1729	.1
11	0118	1.7	0912	.4	1225	.5	1811	0.0
12	0154	1.8	0941	.3	1317	.5	1854	0.0
13	0227	1.9	1006	.3	1400	.6	1935	0.0
14	0259	2.0	1031	.3	1439	.6	2014	-.1
15	0331	2.0	1053	.2	1515	.7	2049	0.0
16	0358	1.9	1118	.2	1554	.7	2128	0.0
17	0430	1.9	1143	.2	1639	.8	2206	.1
18	0458	1.8	1208	.1	1725	.9	2249	.3
19	0527	1.6	1237	.1	1821	.9	----	---
20	2341	.3*	0559	1.4	1305	.1	1919	1.0
21	0044	.5	0627	1.2	1340	0.0	2035	1.2
22	0218	.7	0706	1.0	1416	0.0	2147	1.4
23	0438	.7	0748	.8	1505	0.0	2257	1.5
24	0659	.5	0907	.6	1602	-.1	----	---
25	0000	1.8	0804	.4	1057	.5	1703	-.1
26	0053	2.0	0845	.3	1224	.5	1806	-.2
27	0141	2.0	0918	.2	1330	.5	1902	-.2
28	0224	2.1	0950	.1	1424	.6	1957	-.2
29	0306	2.1	1024	0.0	1512	.8	2049	-.2
30	0345	2.0	1054	0.0	1601	.9	2138	-.1
31	0421	1.9	1123	0.0	1649	.9	2227	.1

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
FEBRUARY 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0455	1.7	1155	0.0	1742	1.0	2319	.3
2	0527	1.4	1223	0.0	1831	1.1	----	---
3	0018	.4	0559	1.2	1253	0.0	1933	1.2
4	0130	.6	0627	1.0	1325	.1	2041	1.3
5	0319	.7	0653	.8	1400	.1	2155	1.3
6	1452	.2	2308	1.4	----	---	----	---
7	1548	.2	----	---	----	---	----	---
8	0003	1.5	0834	.3	1117	.4	1653	.2
9	0051	1.6	0849	.3	1227	.5	1752	.1
10	0128	1.7	0905	.3	1311	.5	1841	0.0
11	0200	1.8	0923	.3	1350	.6	1923	0.0
12	0232	1.8	0942	.2	1425	.8	2005	0.0
13	0301	1.8	1003	.1	1500	.9	2045	0.0
14	0329	1.7	1022	.1	1539	.9	2126	0.0
15	0354	1.6	1046	0.0	1618	1.0	2208	.1
16	0426	1.5	1109	0.0	1702	1.1	2254	.2
17	0455	1.4	1137	0.0	1751	1.2	----	---
18	2352	.3*	0523	1.2	1206	0.0	1847	1.3
19	0102	.5	0555	.9	1240	0.0	1953	1.4
20	0247	.6	0631	.8	1322	0.0	2112	1.4
21	0521	.4	0726	.5	1417	0.0	2230	1.6
22	0704	.3	0936	.4	1532	0.0	----	---
23	2337	1.7*	0742	.3	1131	.4	1655	0.0
24	0032	1.8	0814	.1	1243	.5	1804	0.0
25	0120	1.9	0843	.1	1333	.7	1906	-.1
26	0202	1.9	0910	0.0	1420	.9	1958	-.1
27	0241	1.8	0936	-.1	1503	1.0	2051	-.1
28	0314	1.7	1003	-.1	1542	1.1	2139	0.0

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
MARCH 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0347	1.5	1027	-.1	1624	1.3	2229	.1
2	0419	1.3	1053	-.1	1706	1.3	2320	.3
3	0451	1.1	1118	-.1	1749	1.4	----	---
4	0017	.9	0520	.9	1144	0.0	1841	1.4
5	0124	.4	0548	.8	1212	.1	1939	1.4
6	0309	.5	0613	.6	1247	.1	2049	1.3
7	1332	.2	2205	1.4	----	---	----	---
8	0714	.3	0922	.4	1452	.3	2315	1.4
9	0732	.3	1121	.4	1621	.3	----	---
10	0006	1.4	0753	.3	1219	.5	1730	.2
11	0046	1.5	0809	.2	1256	.6	1826	.1
12	0121	1.5	0826	.2	1333	.8	1914	.1
13	0154	1.5	0844	.1	1409	.9	1957	0.0
14	0222	1.5	0904	0.0	1441	1.1	2042	0.0
15	0251	1.4	0926	-.1	1520	1.2	2128	0.0
16	0323	1.3	0947	-.1	1559	1.4	2216	.1
17	0354	1.2	1016	-.2	1641	1.4	2310	.2
18	0426	1.0	1042	-.2	1730	1.5	----	---
19	0015	.3	0501	.8	1114	-.2	1822	1.5
20	0132	.3	0543	.6	1153	-.1	1927	1.5
21	0321	.3	0639	.4	1239	0.0	2042	1.5
22	0509	.3	0818	.3	1348	.1	2159	1.6
23	0618	.2	1031	.3	1523	.1	2306	1.6
24	0656	.1	1152	.5	1653	.1	----	---
25	0002	1.6	0728	0.0	1249	.7	1809	.1
26	0048	1.5	0753	-.1	1331	.9	1912	.1
27	0131	1.4	0818	-.1	1410	1.1	2007	.1
28	0208	1.4	0843	-.2	1448	1.3	2058	.1
29	0240	1.2	0907	-.2	1524	1.4	2147	.1
30	0315	1.0	0931	-.2	1559	1.4	2235	.2
31	0347	.9	0954	-.2	1636	1.5	2324	.2

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
APRIL 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0416	.8	1019	-.1	1716	1.5	----	---
2	0020	.3	0448	.6	1044	-.1	1802	1.4
3	0129	.3	0523	.5	1112	0.0	1850	1.4
4	0258	.3	0605	.4	1147	.1	1949	1.4
5	0435	.3	0724	.3	1229	.2	2059	1.4
6	0544	.3	0937	.3	1352	.3	2205	1.3
7	0619	.2	1109	.4	1535	.3	2301	1.3
8	0641	.2	1158	.6	1701	.3	----	---
9	2347	1.3*	0659	.1	1237	.8	1803	.3
10	0026	1.3	0720	0.0	1309	.9	1859	.2
11	0101	1.2	0741	-.1	1347	1.1	1952	.1
12	0136	1.1	0803	-.2	1423	1.4	2044	.1
13	0211	1.0	0828	-.2	1458	1.5	2135	.1
14	0249	.9	0856	-.3	1540	1.6	2230	.1
15	0325	.8	0928	-.3	1625	1.8	2331	.1
16	0407	.6	1000	-.3	1714	1.8	----	---
17	0038	.1	0452	.5	1038	-.3	1807	1.8
18	0154	.1	0551	.3	1119	-.2	1908	1.7
19	0314	.1	0716	.3	1216	0.0	2014	1.6
20	0428	0.0	0909	.3	1335	.2	2121	1.5
21	0518	0.0	1046	.5	1518	.3	2225	1.4
22	0600	-.1	1155	.7	1658	.3	2319	1.4
23	0632	-.2	1240	.9	1817	.3	----	---
24	0008	1.2	0659	-.2	1321	1.1	1923	.3
25	0050	1.0	0724	-.2	1357	1.4	2021	.2
26	0129	.9	0749	-.3	1433	1.4	2113	.2
27	0204	.8	0812	-.3	1505	1.6	2202	.2
28	0239	.7	0837	-.3	1540	1.6	2246	.2
29	0315	.6	0904	-.2	1615	1.7	----	---
30	2336	.2*	0350	.5	0930	-.2	1651	1.6

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
MAY 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0028	.2	0429	.4	0959	-.1	1733	1.6
2	0124	.2	0511	.3	1033	0.0	1815	1.5
3	0223	.2	0607	.3	1108	.1	1906	1.4
4	0329	.2	0732	.3	1157	.2	1959	1.4
5	0417	.1	0917	.3	1259	.3	2052	1.3
6	0452	.1	1033	.5	1442	.3	2145	1.2
7	0521	0.0	1126	.7	1620	.4	2231	1.1
8	0545	0.0	1208	.9	1742	.3	2319	1.0
9	0611	-.1	1245	1.1	1852	.3	----	---
10	0001	.9	0638	-.2	1322	1.4	1955	.3
11	0046	.9	0707	-.3	1400	1.6	2051	.2
12	0132	.7	0739	-.3	1442	1.8	2149	.1
13	0217	.6	0814	-.3	1525	2.0	2245	0.0
14	0306	.5	0853	-.3	1613	2.0	----	---
15	2344	0.0*	0355	.4	0934	-.3	1702	2.0
16	0047	0.0	0454	.3	1019	-.3	1754	2.0
17	0146	0.0	0606	.3	1108	-.1	1847	1.8
18	0245	-.1	0735	.3	1211	.1	1943	1.7
19	0337	-.1	0908	.5	1333	.3	2036	1.4
20	0422	-.2	1030	.7	1516	.4	2131	1.3
21	0500	-.2	1133	.9	1657	.4	2227	1.1
22	0532	-.2	1225	1.2	1827	.4	2315	.9
23	0603	-.2	1307	1.4	1944	.3	----	---
24	0004	.8	0631	-.2	1342	1.5	2043	.3
25	0051	.6	0700	-.3	1417	1.6	2135	.3
26	0130	.5	0728	-.2	1449	1.7	2217	.2
27	0210	.4	0756	-.2	1521	1.8	2259	.2
28	0252	.4	0828	-.2	1558	1.8	----	---
29	2339	.1*	0333	.4	0900	-.2	1632	1.8
30	0020	.1	0415	.3	0935	-.1	1710	1.7
31	0102	.1	0505	.3	1011	0.0	1749	1.6

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
JUNE 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0144	.1	0601	.3	1050	.1	1825	1.5
2	0222	.1	0708	.4	1138	.2	1907	1.4
3	0300	.1	0825	.5	1237	.3	1947	1.4
4	0333	0.0	0941	.7	1403	.5	2029	1.2
5	0404	0.0	1042	.9	1546	.5	2117	1.0
6	0436	-.1	1132	1.1	1731	.5	2209	.9
7	0508	-.2	1218	1.4	1856	.4	2305	.8
8	0540	-.3	1300	1.6	2006	.3	----	---
9	0001	.6	0619	-.3	1345	1.8	2106	.2
10	0101	.5	0701	-.3	1430	2.0	2205	.1
11	0158	.4	0744	-.3	1515	2.1	2250	0.0
12	0254	.4	0830	-.3	1600	2.2	----	---
13	2339	0.0*	0354	.4	0922	-.3	1647	2.1
14	0026	-.1	0456	.4	1011	-.2	1733	2.0
15	0116	-.1	0605	.5	1106	0.0	1819	1.9
16	0158	-.1	0719	.6	1212	.2	1905	1.6
17	0241	-.1	0839	.8	1329	.4	1951	1.4
18	0318	-.1	0957	.9	1508	.6	2038	1.1
19	0357	-.1	1103	1.2	1703	.6	2127	.9
20	0433	-.1	1159	1.4	1849	.6	2223	.7
21	0508	-.1	1245	1.5	2009	.4	2318	.6
22	0544	-.1	1322	1.6	2104	.3	----	---
23	0024	.5	0620	-.1	1358	1.8	2146	.3
24	0110	.4	0656	-.1	1434	1.8	2218	.3
25	0158	.4	0734	-.1	1506	1.9	2250	.2
26	0240	.4	0809	-.1	1539	1.9	2319	.2
27	0319	.5	0848	-.1	1611	1.9	----	---
28	2347	.2*	0403	.5	0923	0.0	1643	1.8
29	0018	.2	0446	.5	1002	.1	1718	1.8
30	0048	.1	0537	.6	1041	.2	1747	1.6

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
JULY 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0120	.1	0633	.7	1126	.3	1818	1.5
2	0148	.1	0736	.8	1225	.4	1851	1.4
3	0219	.1	0845	.9	1344	.6	1927	1.2
4	0251	0.0	0954	1.1	1532	.7	2011	.9
5	0329	0.0	1100	1.4	1736	.7	2103	.8
6	0411	-.1	1151	1.5	1923	.5	2219	.6
7	0458	-.2	1241	1.8	2022	.4	----	---
8	2338	.5*	0548	-.2	1330	2.0	2111	.3
9	0051	.5	0641	-.3	1415	2.1	2153	.2
10	0153	.5	0732	-.3	1501	2.2	2234	.1
11	0253	.6	0824	-.3	1544	2.2	2310	0.0
12	0347	.7	0917	-.2	1627	2.1	----	---
13	2348	0.0*	0445	.8	1009	0.0	1706	2.0
14	0024	0.0	0545	.9	1104	.2	1746	1.8
15	0101	0.0	0647	.9	1207	.3	1825	1.5
16	0137	0.0	0756	1.1	1323	.6	1900	1.3
17	0212	0.0	0909	1.2	1505	.7	1942	1.0
18	0252	0.0	1021	1.4	1718	.7	2024	.8
19	0335	.1	1123	1.5	1921	.5	2133	.6
20	0420	.1	1216	1.6	2024	.4	2300	.5
21	0506	.1	1301	1.7	2059	.4	----	---
22	0015	.5	0536	.1	1339	1.8	2128	.3
23	0109	.5	0641	.1	1414	1.9	2153	.3
24	0151	.6	0722	0.0	1446	1.9	2214	.3
25	0229	.7	0801	0.0	1516	2.0	2236	.3
26	0305	.7	0839	0.0	1545	1.9	2258	.3
27	0345	.8	0918	.1	1613	1.9	2323	.2
28	0427	.9	0953	.2	1640	1.8	----	---
29	2347	.2*	0509	.9	1035	.3	1709	1.6
30	0013	.2	0557	1.0	1123	.4	1739	1.4
31	0040	.2	0650	1.1	1223	.6	1805	1.3

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
AUGUST 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0109	.1	0755	1.2	1347	.7	1839	1.1
2	0145	.1	0908	1.4	1548	.8	1915	.9
3	0230	.1	1021	1.5	1812	.6	2024	.7
4	0324	.1	1126	1.8	1934	.5	2215	.6
5	0430	0.0	1222	2.0	2016	.4	----	---
6	2350	.6*	0532	0.0	1313	2.1	2052	.3
7	0059	.6	0635	-.1	1358	2.2	2124	.2
8	0155	.8	0730	-.1	1439	2.2	2156	.2
9	0246	.9	0826	-.1	1521	2.1	2224	.1
10	0335	1.0	0918	0.0	1557	2.0	2256	.1
11	0427	1.1	1010	.2	1635	1.8	2325	.1
12	0516	1.3	1106	.3	1711	1.5	----	---
13	2356	.1*	0611	1.4	1208	.5	1743	1.4
14	0028	.1	0707	1.4	1321	.6	1818	1.1
15	0101	.2	0813	1.4	1503	.8	1853	.9
16	0139	.3	0928	1.5	1730	.6	1935	.7
17	0229	.3	1038	1.5	1923	.5	2121	.6
18	0332	.3	1141	1.6	1958	.5	2315	.6
19	0440	.3	1230	1.7	2020	.4	----	---
20	0020	.7	0539	.3	1309	1.8	2042	.4
21	0101	.8	0631	.3	1344	1.9	2102	.3
22	0137	.9	0713	.2	1415	1.9	2122	.3
23	0212	.9	0752	.2	1444	1.9	2140	.3
24	0247	1.0	0834	.2	1509	1.8	2159	.3
25	0324	1.1	0913	.3	1538	1.7	2220	.3
26	0401	1.3	0955	.3	1606	1.6	2245	.2
27	0440	1.4	1041	.3	1635	1.4	2310	.2
28	0525	1.4	1134	.5	1703	1.3	----	---
29	2335	.2*	0617	1.5	1240	.6	1735	1.1
30	0010	.2	0716	1.5	1416	.7	1807	.9
31	0049	.2	0832	1.6	1626	.7	1903	.8

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
SEPTEMBER 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0143	.3	0951	1.7	1820	.5	2056	.6
2	0255	.3	1100	1.9	1907	.4	2257	.6
3	0418	.3	1158	2.0	1941	.3	----	---
4	0011	.8	0534	.2	1246	2.0	2011	.3
5	0106	.9	0638	.2	1332	2.0	2038	.2
6	0152	1.1	0736	.2	1410	2.0	2106	.2
7	0236	1.3	0831	.2	1449	1.9	2133	.1
8	0321	1.4	0923	.2	1525	1.7	2157	.1
9	0401	1.5	1015	.3	1600	1.4	2225	.1
10	0447	1.6	1110	.4	1635	1.3	2254	.1
11	0532	1.6	1210	.5	1704	1.1	2323	.2
12	0621	1.6	1325	.6	1739	.9	----	---
13	2348	.3*	0719	1.6	1508	.7	1817	.8
14	0027	.3	0826	1.6	1711	.5	1927	.6
15	0116	.4	0943	1.6	1827	.5	2156	.6
16	0238	.5	1049	1.6	1902	.5	----	---
17	2325	.7*	0408	.5	1142	1.7	1923	.4
18	0014	.8	0520	.4	1226	1.7	1944	.4
19	0048	.9	0616	.4	1301	1.7	2003	.3
20	0123	1.0	0704	.3	1333	1.7	2019	.3
21	0155	1.2	0747	.3	1402	1.6	2041	.3
22	0225	1.4	0829	.3	1431	1.5	2059	.2
23	0300	1.5	0914	.3	1459	1.4	2121	.2
24	0339	1.6	1000	.3	1531	1.3	2146	.1
25	0418	1.7	1052	.4	1602	1.2	2214	.1
26	0503	1.8	1151	.5	1634	1.0	2245	.1
27	0552	1.8	1306	.5	1713	.9	2319	.2
28	0654	1.8	1445	.6	1805	.7	----	---
29	0005	.3	0803	1.8	1632	.5	1945	.6
30	0107	.3	0918	1.8	1740	.4	2154	.6

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
OCTOBER 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0238	.3	1026	1.9	1822	.3	2323	.8
2	0416	.4	1125	1.9	.854	.3	----	---
3	0019	.9	0537	.4	1215	1.8	1920	.2
4	0104	1.2	0648	.3	1259	1.7	1947	.1
5	0146	1.4	0745	.3	1339	1.5	2013	.1
6	0225	1.6	0842	.3	1415	1.4	2037	0.0
7	0304	1.7	0932	.3	1448	1.3	2104	0.0
8	0342	1.8	1025	.3	1524	1.1	2127	.1
9	0421	1.9	1117	.4	1559	.9	2155	.1
10	0500	1.9	1214	.4	1631	.9	2224	.2
11	0544	1.8	1323	.5	1713	.7	2252	.3
12	0634	1.8	1448	.5	1805	.6	2324	.3
13	0731	1.7	1615	.5	1943	.6	----	---
14	0010	.4	0838	1.6	1716	.4	2154	.6
15	0132	.5	0941	1.5	1753	.4	2313	.8
16	0325	.6	1038	1.5	1817	.3	----	---
17	2352	.9*	0449	.6	1123	1.5	1838	.3
18	0027	1.0	0554	.5	1206	1.4	1858	.3
19	0059	1.2	0650	.5	1240	1.4	1918	.2
20	0131	1.4	0741	.4	1312	1.3	1939	.1
21	0206	1.6	0831	.4	1346	1.2	2003	.1
22	0241	1.8	0921	.3	1423	1.1	2029	0.0
23	0320	2.0	1013	.3	1458	1.0	2058	0.0
24	0400	2.0	1109	.3	1537	.9	2130	0.0
25	0448	2.0	1212	.3	1622	.7	2208	0.0
26	0536	2.0	1324	.3	1716	.6	2250	.1
27	0634	2.0	1444	.3	1834	.5	----	---
28	2339	.3*	0735	2.0	1553	.3	2029	.6
29	0052	.3	0841	1.8	1647	.3	2215	.7
30	0232	.5	0945	1.7	1726	.2	----	---
31	2325	.9*	0418	.6	1042	1.6	1801	.1

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
NOVEMBER 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0014	1.2	0547	.5	1135	1.4	1830	0.0
2	0056	1.4	0659	.5	1222	1.3	1856	0.0
3	0138	1.6	0802	.4	1302	1.1	1923	0.0
4	0213	1.8	0856	.4	1341	1.0	1949	0.0
5	0247	2.0	0949	.3	1420	.9	2016	0.0
6	0323	2.0	1038	.3	1455	.8	2042	0.0
7	0359	2.0	1126	.3	1533	.7	2110	.1
8	0437	2.0	1218	.3	1613	.6	2141	.1
9	0516	1.9	1311	.3	1701	.6	2213	.2
10	0559	1.9	1410	.3	1757	.5	2248	.3
11	0646	1.7	1509	.3	1925	.5	----	---
12	2337	.4*	0735	1.6	1556	.3	2107	.6
13	0040	.5	0828	1.5	1633	.3	2231	.8
14	0219	.7	0918	1.4	1703	.3	2319	.9
15	0406	.7	1010	1.3	1726	.2	----	---
16	2358	1.1*	0532	.7	1053	1.2	1750	.1
17	0037	1.4	0643	.6	1139	1.1	1815	.1
18	0109	1.6	0742	.5	1223	1.0	1846	0.0
19	0146	1.8	0838	.4	1308	.9	1915	-.1
20	0223	2.0	0933	.3	1351	.8	1950	-.2
21	0305	2.1	1027	.3	1439	.7	2026	-.2
22	0350	2.2	1120	.3	1525	.6	2107	-.2
23	0435	2.2	1217	.2	1621	.6	2150	-.1
24	0525	2.2	1314	.2	1728	.5	2238	0.0
25	0613	2.0	1410	.2	1848	.6	----	---
26	2337	.2*	0706	2.0	1502	.1	2024	.7
27	0053	.4	0759	1.7	1548	.1	2153	.9
28	0229	.6	0855	1.5	1628	0.0	2303	1.1
29	0422	.7	0951	1.3	1703	0.0	----	---
30	2358	1.4*	0603	.7	1045	1.1	1737	0.0

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
DECEMBER 1991
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0044	1.6	0724	.6	1141	.9	1809	-.1
2	0126	1.8	0829	.5	1230	.8	1838	-.1
3	0201	1.9	0922	.4	1315	.7	1910	-.1
4	0236	2.0	1007	.3	1357	.6	1941	-.1
5	0311	2.0	1046	.3	1439	.6	2013	0.0
6	0343	2.0	1124	.3	1521	.6	2048	0.0
7	0419	2.0	1202	.3	1602	.5	2122	.1
8	0453	2.0	1242	.3	1648	.5	2158	.2
9	0530	1.9	1319	.3	1744	.6	2237	.3
10	0605	1.8	1359	.3	1843	.6	2322	.3
11	0644	1.6	1433	.3	2001	.7	----	---
12	0014	.5	0719	1.4	1508	.2	2118	.9
13	0133	.7	0758	1.3	1538	.2	2229	1.0
14	0320	.8	0844	1.2	1612	.1	2318	1.2
15	0514	.8	0936	1.0	1644	.1	----	---
16	0004	1.4	0648	.7	1033	.9	1719	0.0
17	0046	1.7	0757	.5	1137	.8	1758	-.1
18	0129	1.9	0853	.4	1237	.7	1839	-.2
19	0211	2.1	0941	.3	1333	.6	1923	-.3
20	0253	2.2	1027	.2	1428	.6	2013	-.3
21	0338	2.3	1112	.1	1524	.6	2059	-.3
22	0421	2.3	1154	.1	1621	.6	2148	-.2
23	0506	2.2	1236	.1	1725	.7	2243	0.0
24	0549	2.0	1319	0.0	1836	.8	----	---
25	2339	.3*	0634	1.8	1401	0.0	1952	.9
26	0052	.4	0716	1.5	1443	0.0	2116	1.0
27	0227	.7	0803	1.3	1524	0.0	2230	1.3
28	0429	.8	0851	1.0	1603	0.0	----	---
29	2333	1.4*	0633	.7	0953	.8	1644	0.0
30	0025	1.6	0759	.5	1105	.6	1726	0.0
31	0109	1.8	0855	.4	1211	.5	1807	0.0

* -- TIDE OCCURS ON PREVIOUS DATE.

APPENDIX A

HEIGHT OF THE TIDE AT ANY TIME

The height of the tide at times intermediate to the times of high and low water is needed on occasion, and may be computed by numerical methods. An example of the method, (adapted from table 3 of the data source), is presented here, using the predicted tides for a day at Point Mugu.

Problem: Given that the predicted times and heights of the tides are:

TIME	HEIGHT
0039	4.9
0814	0.2
1510	3.1
1933	2.4

What is the height of the tide at 0300?

Numerical Method

The duration of fall is 08h 14m - 00h 39m = 7h 35m

The time after high water is 03h 00m - 00h 39m = 2h 21m

The range of tide is 4.9 - 0.2 = 4.7 feet

Entering table A-1 at the duration of fall of 7h 40m, which is the nearest value to 7h 35m, the nearest value on the horizontal line to 2h 21m is 2h 18m after high water. Following down this column to its intersection with a range of 4.5 feet which is the nearest value to 4.7 feet, one obtains 0.9 which, being calculated from high water, must be subtracted from 4.9. The approximate height at 0300 is therefore 4.0 feet.

When the duration of rise or fall is greater than 10h 40m, enter the table with one-half the given duration and with one-half the time from nearest high or low water; but if the duration of rise or fall is less than 4h 00m, enter the table with double the given duration and time.

Table A-1 Height of the Tide at Any Time

Duration of rise or fall, see footnote

	Time from the nearest high water or low water														
h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.	h.m.
4 00	0 08	0 16	0 24	0 32	0 40	0 48	0 56	1 04	1 12	1 20	1 28	1 36	1 44	1 52	2 00
4 20	0 09	0 17	0 26	0 35	0 43	0 52	1 01	1 09	1 18	1 27	1 35	1 44	1 53	2 01	2 10
4 40	0 09	0 19	0 28	0 37	0 47	0 56	1 05	1 15	1 24	1 33	1 43	1 52	2 01	2 11	2 20
5 00	0 10	0 20	0 30	0 40	0 50	1 00	1 10	1 20	1 30	1 40	1 50	2 00	2 10	2 20	2 30
5 20	0 11	0 21	0 32	0 43	0 53	1 04	1 15	1 25	1 36	1 47	1 57	2 08	2 19	2 29	2 40
5 40	0 11	0 23	0 34	0 45	0 57	1 08	1 19	1 31	1 42	1 53	2 05	2 16	2 27	2 39	2 50
6 00	0 12	0 24	0 36	0 48	1 00	1 12	1 24	1 36	1 48	2 00	2 12	2 24	2 36	2 48	3 00
6 20	0 13	0 25	0 38	0 51	1 03	1 16	1 29	1 41	1 54	2 07	2 19	2 32	2 45	2 57	3 10
6 40	0 13	0 27	0 40	0 53	1 07	1 20	1 33	1 47	2 00	2 13	2 27	2 40	2 53	3 07	3 20
7 00	0 14	0 28	0 42	0 56	1 10	1 24	1 38	1 52	2 06	2 20	2 34	2 48	3 02	3 16	3 30
7 20	0 15	0 29	0 44	0 59	1 13	1 28	1 43	1 57	2 12	2 27	2 41	2 56	3 11	3 25	3 40
7 40	0 15	0 31	0 46	1 01	1 17	1 32	1 47	2 03	2 18	2 33	2 49	3 04	3 19	3 35	3 50
8 00	0 16	0 32	0 48	1 04	1 20	1 36	1 52	2 08	2 24	2 40	2 56	3 12	3 28	3 44	4 00
8 20	0 17	0 33	0 50	1 07	1 23	1 40	1 57	2 13	2 30	2 47	3 03	3 20	3 37	3 53	4 10
8 40	0 17	0 35	0 52	1 09	1 27	1 44	2 01	2 19	2 36	2 53	3 11	3 28	3 45	4 03	4 20
9 00	0 18	0 36	0 54	1 12	1 30	1 48	2 06	2 24	2 42	3 00	3 18	3 36	3 54	4 12	4 30
9 20	0 19	0 37	0 56	1 15	1 33	1 52	2 11	2 29	2 48	3 07	3 25	3 44	4 03	4 21	4 40
9 40	0 19	0 39	0 58	1 17	1 37	1 56	2 15	2 35	2 54	3 13	3 33	3 52	4 11	4 31	4 50
10 00	0 20	0 40	1 00	1 20	1 40	2 00	2 20	2 40	3 00	3 20	3 40	4 00	4 20	4 40	5 00
10 20	0 21	0 41	1 02	1 23	1 43	2 04	2 25	2 45	3 06	3 27	3 47	4 08	4 29	4 49	5 10
10 40	0 21	0 43	1 04	1 25	1 47	2 08	2 29	2 51	3 12	3 33	3 55	4 16	4 37	4 58	5 20

Range of tide, see footnote

	Correction to height														
Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5
1.5	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8
2.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
2.5	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2
3.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0	1.2	1.3	1.5
3.5	0.0	0.0	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.6	1.8
4.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.2	1.4	1.6	1.8	2.0
4.5	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2
5.0	0.0	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.0	1.2	1.5	1.7	2.0	2.2	2.5
5.5	0.0	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.1	1.4	1.6	1.9	2.2	2.5	2.8
6.0	0.0	0.1	0.1	0.3	0.4	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.7	3.0
6.5	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.1	1.3	1.6	1.9	2.2	2.6	2.9	3.2
7.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.4	1.8	2.1	2.4	2.8	3.1	3.5
7.5	0.0	0.1	0.2	0.3	0.5	0.7	1.0	1.2	1.5	1.9	2.2	2.6	3.0	3.4	3.8
8.0	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.3	1.6	2.0	2.4	2.8	3.2	3.6	4.0
8.5	0.0	0.1	0.2	0.4	0.6	0.8	1.1	1.4	1.8	2.1	2.5	2.9	3.4	3.8	4.2
9.0	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.5	1.9	2.2	2.7	3.1	3.6	4.0	4.5
9.5	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.6	2.0	2.4	2.8	3.3	3.8	4.3	4.8
10.0	0.0	0.1	0.2	0.4	0.7	1.0	1.3	1.7	2.1	2.5	3.0	3.5	4.0	4.5	5.0
10.5	0.0	0.1	0.3	0.5	0.7	1.0	1.3	1.7	2.2	2.6	3.1	3.6	4.2	4.7	5.2
11.0	0.0	0.1	0.3	0.5	0.7	1.1	1.4	1.8	2.3	2.8	3.3	3.8	4.4	4.9	5.5
11.5	0.0	0.1	0.3	0.5	0.8	1.1	1.5	1.9	2.4	2.9	3.4	4.0	4.6	5.1	5.8
12.0	0.0	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.0	3.6	4.1	4.8	5.4	6.0
12.5	0.0	0.1	0.3	0.5	0.8	1.2	1.6	2.1	2.6	3.1	3.7	4.3	5.0	5.6	6.2
13.0	0.0	0.1	0.3	0.6	0.9	1.2	1.7	2.2	2.7	3.2	3.9	4.5	5.1	5.8	6.5
13.5	0.0	0.1	0.3	0.6	0.9	1.3	1.7	2.2	2.8	3.4	4.0	4.7	5.3	6.0	6.8
14.0	0.0	0.2	0.3	0.6	0.9	1.3	1.8	2.3	2.9	3.5	4.2	4.8	5.5	6.3	7.0
14.5	0.0	0.2	0.4	0.6	1.0	1.4	1.9	2.4	3.0	3.6	4.3	5.0	5.7	6.5	7.2
15.0	0.0	0.2	0.4	0.6	1.0	1.4	1.9	2.5	3.1	3.8	4.4	5.2	5.9	6.7	7.5
15.5	0.0	0.2	0.4	0.7	1.0	1.5	2.0	2.6	3.2	3.9	4.6	5.4	6.1	6.9	7.8
16.0	0.0	0.2	0.4	0.7	1.1	1.5	2.1	2.6	3.3	4.0	4.7	5.5	6.3	7.2	8.0
16.5	0.0	0.2	0.4	0.7	1.1	1.6	2.1	2.7	3.4	4.1	4.9	5.7	6.5	7.4	8.2
17.0	0.0	0.2	0.4	0.7	1.1	1.6	2.2	2.8	3.5	4.2	5.0	5.9	6.7	7.6	8.5
17.5	0.0	0.2	0.4	0.8	1.2	1.7	2.2	2.9	3.6	4.4	5.2	6.0	6.9	7.8	8.8
18.0	0.0	0.2	0.4	0.8	1.2	1.7	2.3	3.0	3.7	4.5	5.3	6.2	7.1	8.1	9.0
18.5	0.1	0.2	0.5	0.8	1.2	1.8	2.4	3.1	3.8	4.6	5.5	6.4	7.3	8.3	9.2
19.0	0.1	0.2	0.5	0.8	1.3	1.8	2.4	3.1	3.9	4.8	5.6	6.6	7.5	8.5	9.5
19.5	0.1	0.2	0.5	0.8	1.3	1.9	2.5	3.2	4.0	4.9	5.8	6.7	7.7	8.7	9.8
20.0	0.1	0.2	0.5	0.9	1.3	1.9	2.6	3.3	4.1	5.0	5.9	6.9	7.9	9.0	10.0

Obtain from the predictions the high water and low water, one of which is before and the other after the time for which the height is required. The difference between the times of occurrence of these tides is the duration of rise or fall, and the difference between their heights is the range of tide for the above table. Find the difference between the nearest high or low water and the time for which the height is required.

Enter the table with the duration of rise or fall, printed in heavy-faced type, which most nearly agrees with the actual value, and on that horizontal line find the time from the nearest high or low water which agrees most nearly with the corresponding actual difference. The correction sought is in the column directly below, on the line with the range of tide.

When the nearest tide is high water, subtract the correction.

When the nearest tide is low water, add the correction.

APPENDIX B

EQUINOXES, SOLSTICES, AND LUNAR PHASES 1991

The dates and times for Vernal and Autumnal Equinoxes and Summer and Winter Solstices during 1991 are listed in table B-1. The 1991 dates and times for phases of the moon are given in table B-2. Times are Pacific Standard Time, add 1 hour when Daylight Savings Time is in effect; add 2 hours for times in the Barking Sands area.

Table B-1. Equinoxes and Solstices, 1991, Point Mugu Area

Vernal Equinox	20 March	1902 PST	Beginning of Spring Day and night equal length
Summer Solstice	21 June	1319 PST	Beginning of Summer Greatest duration daylight
Autumnal Equinox	23 September	0448 PST	Beginning of Autumn Day and night equal length
Winter Solstice	22 December	0054 PST	Beginning of Winter Greatest duration darkness

Table B-2. Lunar Phases, 1991, Point Mugu Area

	JANUARY		FEBRUARY		MARCH		APRIL	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
First Quarter	23	0621	21	1458	22	2203	21	0439
Full Moon	29	2210	28	1025	29	2317	28	1258
Last Quarter	07	1035	06	0552	08	0232	06	2245
New Moon	15	1550	14	0932	16	0010	14	1138

	MAY		JUNE		JULY		AUGUST	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
First Quarter	20	1146	18	2019	18	0711	16	2101
Full Moon	28	0337	26	1858	26	1024	25	0107
Last Quarter	06	1646	05	0730	04	1850	03	0325
New Moon	13	2036	12	0406	11	1106	09	1828

	SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
First Quarter	15	1401	15	0933	14	0602	14	0132
Full Moon	23	1440	23	0308	21	1456	21	0223
Last Quarter	01	1016	29	2310	28	0721	27	1755
New Moon	08	0301	07	1339	06	0311	05	1956
Last Quarter	30	1630	--	----	--	----	--	----

Because the earth's period of revolution about the sun (365.24+ days) is not evenly divisible by the moon's period of revolution about the earth (27.32+ days), the dates and times of lunar phases, moonrise and moonset, and tidal data must be recomputed for each year. The following information, however, is based on geometrical relationships and holds true for all times:

1. The New Moon rises at sunrise, crosses the meridian at noon, and sets at sunset.

2. The First Quarter Moon rises at noon, crosses the meridian at sunset, and sets at midnight.

3. The Full Moon rises at sunset, crosses the meridian at midnight, and sets at sunrise.

4. The Last Quarter Moon rises at midnight, crosses the meridian at sunrise and sets at noon.

APPENDIX C

SUNRISE AND SUNSET TABLES

Sunrise, Sunset, and Duration of Twilight for Point Mugu, CA
34°07' N, 119°07' W

Note: All times are Pacific Standard Time (120th meridian); add 1 hour when Daylight Savings Time is in effect.

Date	January		February		March		April		May		June		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0702	1658	0654	1727	0626	1753	0544	1817	0507	1840	0446	1903	1
2	0703	1659	0653	1728	0624	1753	0543	1818	0506	1841	0446	1903	2
3	0703	1700	0652	1729	0623	1754	0541	1819	0505	1842	0445	1904	3
4	0703	1700	0652	1730	0622	1755	0540	1819	0504	1843	0445	1904	4
5	0703	1701	0651	1731	0621	1756	0539	1820	0503	1843	0445	1905	5
6	0703	1702	0650	1732	0619	1757	0537	1821	0502	1844	0445	1905	6
7	0703	1703	0649	1733	0618	1758	0536	1822	0502	1845	0445	1906	7
8	0703	1704	0648	1734	0617	1758	0535	1822	0501	1846	0444	1906	8
9	0703	1705	0647	1734	0615	1759	0533	1823	0500	1846	0444	1907	9
10	0703	1706	0647	1735	0614	1800	0532	1824	0459	1847	0444	1907	10
11	0703	1706	0646	1736	0613	1801	0531	1825	0458	1848	0444	1908	11
12	0703	1707	0645	1737	0611	1802	0530	1825	0457	1849	0444	1908	12
13	0703	1708	0644	1738	0610	1802	0528	1826	0456	1849	0444	1909	13
14	0702	1709	0643	1739	0609	1803	0527	1827	0456	1850	0444	1909	14
15	0702	1710	0642	1740	0607	1804	0526	1828	0455	1851	0444	1909	15
16	0702	1711	0641	1741	0606	1805	0525	1829	0454	1852	0444	1910	16
17	0702	1712	0640	1742	0605	1806	0523	1829	0453	1852	0444	1910	17
18	0701	1713	0639	1743	0603	1806	0522	1830	0453	1853	0445	1910	18
19	0701	1714	0637	1744	0602	1807	0521	1831	0452	1854	0445	1911	19
20	0701	1715	0636	1745	0601	1808	0520	1832	0451	1855	0445	1911	20
21	0700	1716	0635	1746	0559	1809	0518	1832	0451	1855	0445	1911	21
22	0700	1717	0634	1747	0558	1809	0517	1833	0450	1856	0445	1911	22
23	0659	1718	0633	1747	0556	1810	0516	1834	0450	1857	0446	1911	23
24	0659	1719	0632	1748	0555	1811	0515	1835	0449	1857	0446	1912	24
25	0658	1720	0630	1749	0554	1812	0514	1835	0449	1858	0446	1912	25
26	0658	1721	0629	1750	0552	1813	0513	1836	0448	1859	0446	1912	26
27	0657	1722	0628	1751	0551	1813	0512	1837	0448	1900	0447	1912	27
28	0657	1723	0627	1752	0550	1814	0511	1838	0447	1900	0447	1912	28
29	0656	1724	0626	1752	0548	1815	0509	1839	0447	1901	0447	1912	29
30	0655	1725			0547	1816	0508	1839	0447	1901	0448	1912	30
31	0655	1726			0546	1816			0446	1902			31
	Average twilight Civil: 27 min. Nautical: 30 min.		Average twilight Civil: 26 min. Nautical: 29 min.		Average twilight Civil: 25 min. Nautical: 26 min.		Average twilight Civil: 26 min. Nautical: 27 min.		Average twilight Civil: 28 min. Nautical: 61 min.		Average twilight Civil: 29 min. Nautical: 68 min.		

Date	July		August		September		October		November		December		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0648	1912	0607	1858	0530	1823	0551	1741	0616	1704	0644	1647	1
2	0649	1912	0608	1857	0530	1821	0551	1740	0617	1703	0645	1647	2
3	0649	1912	0609	1856	0531	1820	0552	1738	0618	1702	0646	1647	3
4	0650	1912	0610	1855	0532	1819	0553	1737	0619	1701	0646	1647	4
5	0650	1912	0610	1854	0532	1817	0554	1736	0620	1700	0647	1647	5
6	0651	1911	0611	1853	0533	1816	0554	1734	0621	1659	0648	1647	6
7	0651	1911	0612	1852	0534	1815	0555	1733	0621	1658	0649	1647	7
8	0652	1911	0612	1851	0535	1813	0556	1732	0622	1658	0650	1647	8
9	0652	1911	0613	1850	0536	1812	0557	1730	0623	1657	0650	1647	9
10	0653	1910	0614	1849	0536	1810	0557	1729	0624	1656	0651	1647	10
11	0653	1910	0615	1848	0537	1809	0558	1728	0625	1655	0652	1647	11
12	0654	1910	0615	1847	0537	1808	0559	1726	0626	1655	0653	1648	12
13	0654	1909	0616	1846	0538	1806	0600	1725	0627	1654	0653	1648	13
14	0655	1909	0617	1845	0539	1805	0601	1724	0628	1653	0654	1648	14
15	0656	1909	0618	1844	0539	1803	0601	1723	0629	1653	0655	1648	15
16	0656	1908	0618	1843	0540	1802	0602	1721	0630	1652	0655	1649	16
17	0657	1908	0619	1841	0541	1801	0603	1720	0631	1652	0656	1649	17
18	0658	1907	0620	1840	0541	1759	0604	1719	0632	1651	0657	1650	18
19	0658	1907	0620	1839	0542	1758	0605	1718	0633	1651	0657	1650	19
20	0659	1906	0621	1838	0543	1756	0606	1717	0634	1650	0658	1650	20
21	0700	1906	0622	1837	0544	1755	0606	1715	0635	1650	0658	1651	21
22	0700	1905	0623	1835	0544	1754	0607	1714	0636	1649	0659	1651	22
23	0701	1904	0623	1834	0545	1752	0608	1713	0637	1649	0659	1652	23
24	0702	1904	0624	1833	0546	1751	0609	1712	0637	1649	0700	1653	24
25	0702	1903	0625	1832	0546	1749	0610	1711	0638	1648	0700	1653	25
26	0703	1902	0625	1830	0547	1748	0611	1710	0639	1648	0700	1654	26
27	0704	1902	0626	1829	0548	1747	0611	1709	0640	1648	0701	1654	27
28	0704	1901	0627	1828	0549	1745	0612	1708	0641	1647	0701	1655	28
29	0705	1900	0628	1827	0549	1744	0613	1707	0642	1647	0702	1656	29
30	0706	1859	0628	1825	0550	1742	0614	1706	0643	1647	0702	1656	30
31	0707	1858	0629	1824			0615	1705			0702	1657	31
	Average twilight Civil: 29 min. Nautical: 63 min.		Average twilight Civil: 26 min. Nautical: 58 min.		Average twilight Civil: 25 min. Nautical: 55 min.		Average twilight Civil: 25 min. Nautical: 54 min.		Average twilight Civil: 27 min. Nautical: 57 min.		Average twilight Civil: 28 min. Nautical: 59 min.		

Entries for use in future years. These data valid through 2020.

Sunrise, Sunset, and Duration of Twilight for Barking Sands, Kauai, HI
22°02' N, 159°47' W

Note: All times are Alaska-Hawaii Standard Time (150th Meridian).

Date	January Sunrise	January Sunset	February Sunrise	February Sunset	March Sunrise	March Sunset	April Sunrise	April Sunset	May Sunrise	May Sunset	June Sunrise	June Sunset	Date
1	0718	1807	0718	1828	0700	1843	0632	1854	0607	1905	0555	1919	1
2	0719	1808	0717	1829	0659	1843	0631	1855	0607	1906	0555	1919	2
3	0719	1809	0717	1830	0659	1844	0630	1855	0606	1906	0555	1920	3
4	0719	1809	0716	1830	0658	1844	0629	1855	0606	1906	0555	1920	4
5	0719	1810	0716	1831	0657	1845	0628	1856	0605	1907	0555	1920	5
6	0720	1811	0715	1831	0656	1845	0627	1856	0604	1907	0555	1921	6
7	0720	1811	0715	1832	0655	1846	0627	1856	0604	1908	0555	1921	7
8	0720	1812	0714	1833	0654	1846	0626	1857	0603	1908	0555	1921	8
9	0720	1813	0714	1833	0653	1846	0625	1857	0603	1909	0555	1922	9
10	0720	1813	0713	1834	0653	1847	0624	1857	0602	1909	0555	1922	10
11	0720	1814	0713	1834	0652	1847	0623	1858	0602	1909	0555	1922	11
12	0721	1815	0712	1835	0651	1847	0622	1858	0601	1910	0555	1923	12
13	0721	1815	0712	1835	0650	1848	0621	1858	0601	1910	0555	1923	13
14	0721	1816	0711	1836	0649	1848	0620	1859	0600	1911	0555	1923	14
15	0721	1817	0710	1836	0648	1848	0620	1859	0600	1911	0555	1924	15
16	0721	1818	0710	1837	0647	1849	0619	1859	0559	1912	0555	1924	16
17	0721	1818	0709	1837	0646	1849	0618	1900	0559	1912	0556	1924	17
18	0721	1819	0709	1838	0645	1850	0617	1900	0559	1913	0556	1925	18
19	0721	1820	0708	1838	0644	1850	0616	1900	0558	1913	0556	1925	19
20	0720	1820	0707	1839	0643	1850	0615	1901	0558	1914	0556	1925	20
21	0720	1821	0706	1839	0642	1851	0615	1901	0558	1914	0556	1925	21
22	0720	1822	0706	1840	0641	1851	0614	1902	0557	1914	0557	1925	22
23	0720	1822	0705	1840	0641	1851	0613	1902	0557	1915	0557	1926	23
24	0720	1823	0704	1841	0640	1852	0612	1902	0557	1915	0557	1926	24
25	0720	1824	0703	1841	0639	1852	0612	1903	0557	1916	0557	1926	25
26	0719	1824	0703	1842	0638	1852	0611	1903	0556	1916	0558	1926	26
27	0719	1825	0702	1842	0637	1853	0610	1904	0556	1917	0558	1926	27
28	0719	1826	0701	1843	0636	1853	0609	1904	0556	1917	0558	1926	28
29	0719	1826	0701	1843	0635	1853	0609	1904	0556	1917	0558	1926	29
30	0718	1827			0634	1854	0608	1905	0555	1918	0559	1927	30
31	0718	1828			0633	1854			0555	1918			31
	Average twilight Civil: 24 min. Nautical: 51 min.		Average twilight Civil: 23 min. Nautical: 49 min.		Average twilight Civil: 22 min. Nautical: 48 min.		Average twilight Civil: 23 min. Nautical: 50 min.		Average twilight Civil: 24 min. Nautical: 53 min.		Average twilight Civil: 25 min. Nautical: 55 min.		

Date	July Sunrise	July Sunset	August Sunrise	August Sunset	September Sunrise	September Sunset	October Sunrise	October Sunset	November Sunrise	November Sunset	December Sunrise	December Sunset	Date
1	0559	1927	0611	1919	0632	1856	0630	1827	0643	1802	0702	1738	1
2	0559	1927	0612	1919	0632	1855	0631	1826	0643	1802	0702	1738	2
3	0600	1927	0612	1918	0633	1854	0631	1825	0644	1801	0703	1738	3
4	0600	1927	0612	1918	0633	1853	0631	1824	0645	1801	0703	1738	4
5	0600	1927	0613	1917	0633	1852	0632	1823	0645	1800	0704	1738	5
6	0601	1927	0613	1916	0633	1851	0632	1822	0646	1800	0705	1738	6
7	0601	1927	0614	1916	0634	1850	0632	1821	0646	1759	0705	1738	7
8	0602	1927	0614	1915	0634	1849	0633	1820	0647	1759	0706	1738	8
9	0602	1926	0614	1914	0634	1848	0633	1819	0647	1758	0707	1738	9
10	0602	1926	0615	1914	0635	1847	0633	1819	0648	1758	0707	1737	10
11	0603	1926	0615	1913	0635	1846	0634	1818	0649	1758	0708	1737	11
12	0603	1926	0616	1912	0635	1845	0634	1817	0649	1757	0709	1737	12
13	0603	1926	0616	1912	0635	1844	0634	1816	0650	1757	0709	1736	13
14	0604	1926	0616	1911	0636	1843	0635	1815	0650	1757	0710	1736	14
15	0604	1926	0617	1910	0636	1842	0635	1814	0651	1756	0710	1736	15
16	0605	1925	0617	1909	0636	1841	0636	1813	0652	1756	0711	1736	16
17	0605	1925	0617	1909	0636	1840	0636	1813	0652	1756	0712	1736	17
18	0606	1925	0618	1908	0637	1839	0636	1812	0653	1756	0712	1800	18
19	0606	1925	0618	1907	0637	1838	0637	1811	0654	1755	0713	1800	19
20	0606	1924	0618	1906	0637	1837	0637	1810	0654	1755	0713	1800	20
21	0607	1924	0619	1905	0638	1836	0638	1810	0655	1755	0714	1801	21
22	0607	1924	0619	1905	0638	1836	0638	1809	0656	1755	0714	1801	22
23	0608	1923	0619	1904	0638	1835	0639	1808	0656	1755	0715	1802	23
24	0608	1923	0620	1903	0638	1834	0639	1807	0657	1755	0715	1803	24
25	0608	1922	0620	1902	0639	1833	0639	1807	0658	1755	0716	1803	25
26	0609	1922	0620	1901	0639	1832	0640	1806	0658	1755	0716	1804	26
27	0609	1922	0621	1900	0639	1831	0640	1805	0659	1755	0716	1804	27
28	0610	1921	0621	1859	0639	1830	0641	1805	0700	1755	0717	1805	28
29	0610	1921	0621	1859	0639	1829	0641	1804	0700	1755	0717	1805	29
30	0610	1920	0621	1858	0639	1828	0642	1803	0701	1755	0718	1806	30
31	0611	1920	0622	1857			0642	1803			0718	1807	31
	Average twilight Civil: 23 min. Nautical: 50 min.		Average twilight Civil: 23 min. Nautical: 50 min.		Average twilight Civil: 22 min. Nautical: 48 min.		Average twilight Civil: 23 min. Nautical: 49 min.		Average twilight Civil: 24 min. Nautical: 51 min.		Average twilight Civil: 24 min. Nautical: 52 min.		

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